



A 70-year-old man with an existing diagnosis of 5.0 cm abdominal aortic aneurysm and atrial fibrillation presents with acute onset abdominal pain radiating to his back. He is still actively bleeding and his observations show the following:

Blood pressure 90/40 mmHg

Heart rate 140 beats per minute

The decision is made to proceed with emergency surgery within the next thirty minutes

Which of the following is the most appropriate management of warfarin therapy?

- ☐ Give 5 mg vitamin K intravenously
- ☐ Stop warfarin and commence treatment dose enoxaparin only
- ☐ Continue warfarin but bridge with enoxaparin immediately after surgery
- ☐ Give four-factor prothrombin complex concentrate 25-50 units/kg
- ☐ Begin dual therapy with warfarin and enoxaparin until INR is in range

VISIT...

LANZAROTE
Caliente.COM

Give 5 mg vitamin K intravenously	23%
Stop warfarin and commence treatment dose enoxaparin only	8%
Continue warfarin but bridge with enoxaparin immediately after surgery	6%
Give four-factor prothrombin complex concentrate 25-50 units/kg	62%
Begin dual therapy with warfarin and enoxaparin until INR is in range	2%

Patients on warfarin undergoing emergency surgery - give four-factor prothrombin complex concentrate

Important for me Less important

British Journal of Haematology Guidelines in patients on warfarin having emergency surgery:

If surgery can wait for 6-8 hours - give 5 mg vitamin K IV

If surgery can't wait - 25-50 units/kg four-factor prothrombin complex

The guidance is to stop warfarin before elective or emergency surgery, so options 3 and 5 are incorrect

Because this is emergency surgery, reversal of anti-coagulation is necessary so option 2 is incorrect

A 71-year-old man who had rheumatic fever as a child is admitted to the cardiology ward with suspected infective endocarditis. This is confirmed by blood cultures and echocardiography. Which one of the following is most likely to represent a need for surgical intervention?

- ☐ A septic embolism in the right kidney
- ☐ Persistent pyrexia after 48 hours of antibiotics
- ☐ Lengthening of the PR interval on ECG
- ☐ Pre-existing left ventricular impairment
- ☐ *Streptococcus viridans* isolated on blood cultures

A septic embolism in the right kidney

21%

Persistent pyrexia after 48 hours of antibiotics

9%

Lengthening of the PR interval on ECG

50%

Pre-existing left ventricular impairment

13%

Streptococcus viridans

isolated on blood cultures

6%

Infective endocarditis - indications for surgery:

- severe valvular incompetence
- aortic abscess (often indicated by a lengthening PR interval)
- infections resistant to antibiotics/fungal infections
- cardiac failure refractory to standard medical treatment
- recurrent emboli after antibiotic therapy

Important for me Less important

Lengthening of the PR interval is likely to represent an aortic root abscess which will require surgical intervention.

Dr Assem

A 65-year-old patient with chronic kidney disease is found to have a deficiency of antithrombin III after he presented to emergency department with left leg pain and swelling.

A doppler-ultrasound scan of the leg confirms deep venous thrombosis (DVT). The patient is started on dabigatran.

What is the mechanism of action of dabigatran?

- ☐ Activates anti-thrombin III
- ☐ P2Y₁₂ inhibitor
- ☐ Glycoprotein IIb/IIIa inhibitor
- ☐ Direct thrombin inhibitor
- ☐ Direct factor X activator

P2Y12 inhibitor	6%
Glycoprotein IIb/IIIa inhibitor	15%
Direct thrombin inhibitor	52%
Direct factor X activator	15%

Dabigatran is a direct thrombin inhibitor

Important for me
Less important

Below is a table of the drugs and their mechanisms of actions (MOA):

Drug name	MOA
Heparin	activates anti-thrombin III
Clopidogrel	P2Y12 inhibitor
Abciximab	glycoprotein IIb/IIIa inhibitor
Dabigatran	direct thrombin inhibitor
Rivaroxaban	direct factor X inhibitor

Which one of the following is a cause of a soft second heart sound?

- ☐ Aortic stenosis
- ☐ Aortic regurgitation
- ☐ Mitral stenosis
- ☐ Mitral regurgitation
- ☐ Pulmonary hypertension

Aortic stenosis

45%

Aortic regurgitation

21%

Mitral stenosis

9%

Mitral regurgitation

12%

Pulmonary hypertension

12%

Second heart sound (S2)

- loud: hypertension
- soft: AS
- fixed split: ASD
- reversed split: LBBB

Important for me Less important

S2 is soft in severe aortic stenosis

Dr Assem

A 62-year-old man is reviewed two hours after a successful elective DC cardioversion for atrial fibrillation. Six weeks ago he presented in fast atrial fibrillation. A decision was made at the time to warfarinise him for six weeks after which he was to be cardioverted. During this time he had a normal transthoracic echocardiogram. He has no past medical history of note other than treatment for a basal cell carcinoma. What is the most appropriate plan regarding anticoagulation?

- ☐ Can stop immediately
- ☐ Continue warfarinisation for 1 week then review following
- ☐ Lifelong warfarin
- ☐ Lifelong aspirin
- ☐ Continue warfarinisation for 4 weeks then review

Can stop immediately

18%

Continue warfarinisation for 1 week then review following

10%

Lifelong warfarin

17%

Lifelong aspirin

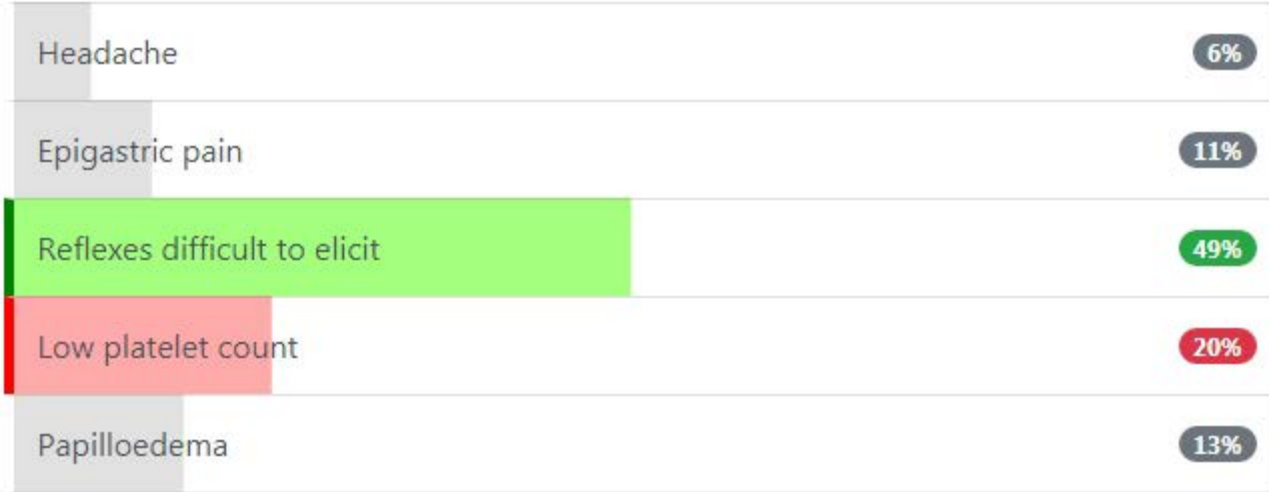
7%

Continue warfarinisation for 4 weeks then review

48%

Which one of the following clinical features would be least consistent with a diagnosis of severe pre-eclampsia?

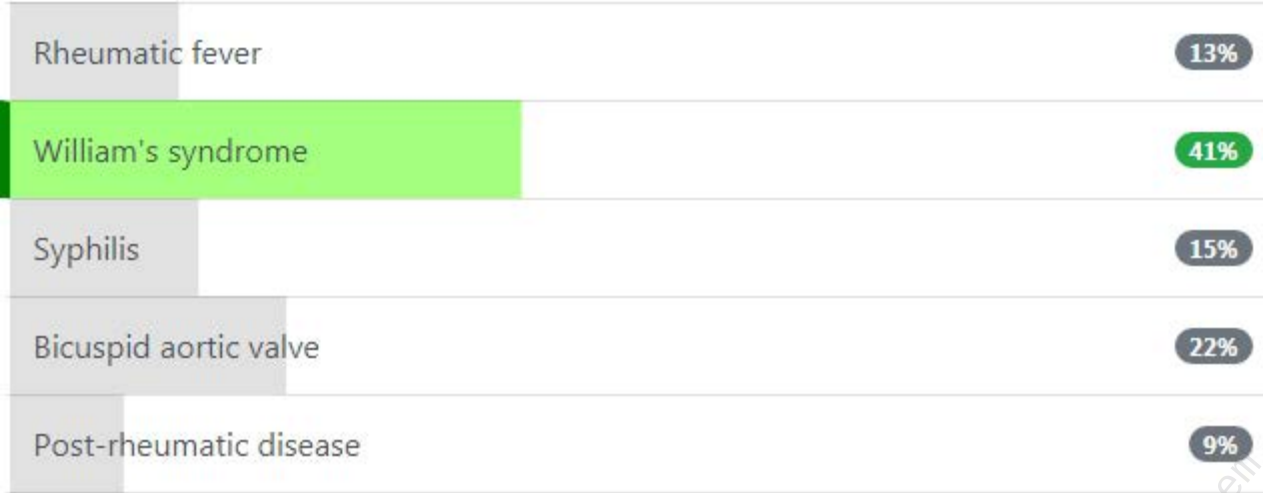
- ☐ Headache
- ☐ Epigastric pain
- ☐ Reflexes difficult to elicit
- ☐ Low platelet count
- ☐ Papilloedema



Severe pre-eclampsia is associated with hyperreflexia and clonus. A low platelet count may indicate the patient is developing HELLP syndrome

Which one of the following is least associated with aortic regurgitation?

- ☐ Rheumatic fever
- ☐ William's syndrome
- ☐ Syphilis
- ☐ Bicuspid aortic valve
- ☐ Post-rheumatic disease



William's syndrome is associated with supra-ventricular aortic stenosis.

A 67-year-old woman presents to the cardiology clinic for urgent review. She is known to have mitral stenosis, but feels like her exercise tolerance has deteriorated rapidly over the past few months. She is short of breath on minimal exercise and suffers from haemoptysis. Current medication includes bisoprolol 10mg, isosorbide dinitrate 60mg, and furosemide 40mg daily. Her blood pressure is 105/88 mmHg, pulse is 62 (slow atrial fibrillation). There are crackles at both lung bases on auscultation of the chest.

Which of the following is the most appropriate next step?

- ☐ Surgical valve replacement
- ☐ Percutaneous mitral valvotomy
- ☐ Digoxin
- ☐ Increased furosemide dose
- ☐ Ramipril

Percutaneous mitral valvotomy

36%

Digoxin

9%

Increased furosemide dose

16%

Ramipril

10%

Percutaneous mitral commissurotomy is the intervention of choice for severe mitral stenosis

Important for me Less important

At this point, with a narrow pulse pressure, resistant cardiac failure, and a narrow, low pulse pressure, it seems appropriate to move to percutaneous valvotomy.

Contra-indications to valvotomy include a mitral valve area $>1.5 \text{ cm}^2$, presence of left atrial thrombus on ECHO, greater than mild mitral regurgitation, severe valve calcification, severe concomitant aortic valve disease, severe combined mixed tricuspid valve disease, and concomitant coronary artery disease requiring bypass surgery. In the event symptoms are not resolved by valvotomy, formal surgical valve replacement is indicated.

Surgical valve replacement is only indicated where valvotomy is contraindicated or is unsuccessful. There is very limited opportunity to increase medical therapy in this population, with systolic blood pressure only just above 100, and a heart rate of 62 beats per minute.

A 71-year-old man who is known to have atrial fibrillation comes for review. He had a transient ischaemic attack two weeks ago and takes bendroflumethiazide for hypertension but is otherwise well. His latest blood pressure is 124/76 mmHg. You are discussing management options to try and reduce his future risk of having a stroke. What is his CHA₂DS₂-VASc score?

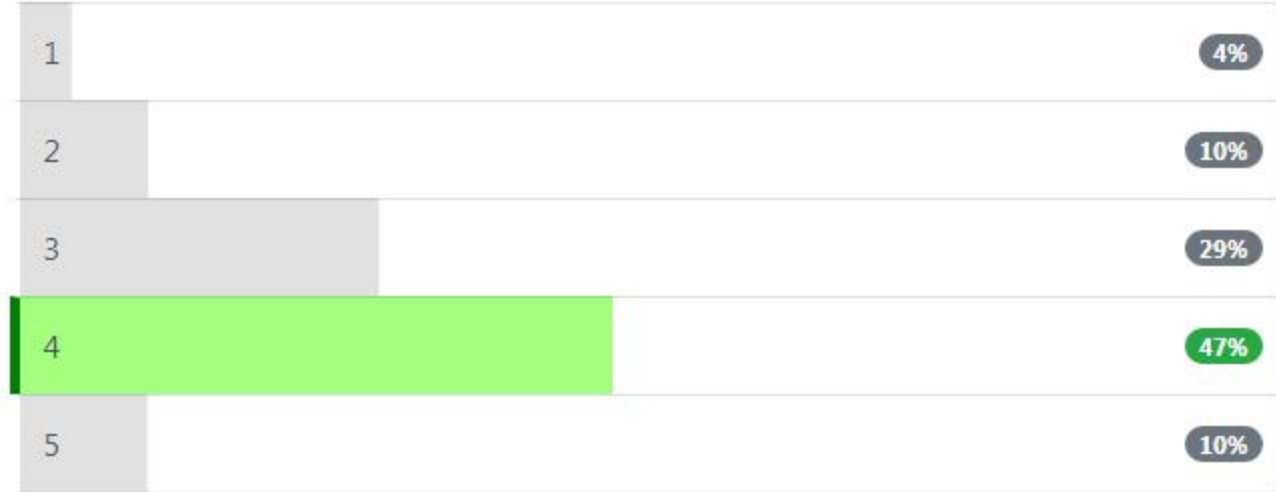
☐ 1

☐ 2

☐ 3

☐ 4

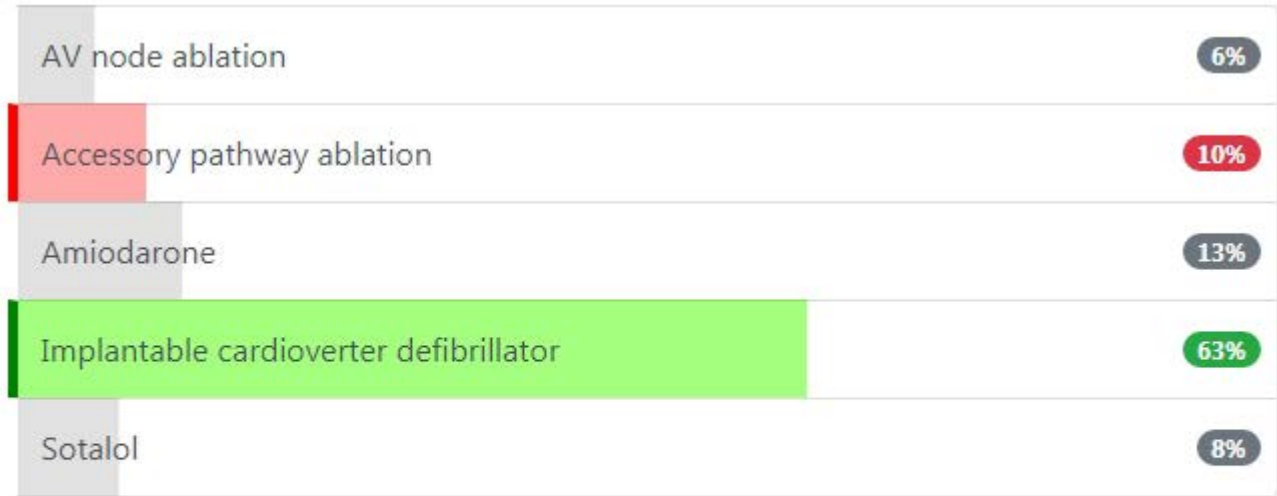
☐ 5



One point for hypertension, one point for being over the age of 65 years (but under the age of 75 years) and two points ('S2') for the recent TIA.

A 28-year-old man with hypertrophic obstructive cardiomyopathy is investigated for palpitations. A 24 hour ECG reveals runs of non-sustained ventricular tachycardia. What is the most appropriate management?

- ☐ AV node ablation
- ☐ Accessory pathway ablation
- ☐ Amiodarone
- ☐ Implantable cardioverter defibrillator
- ☐ Sotalol



Most cardiologists would now proceed to inserting an implantable cardioverter defibrillator to lower the risk of sudden cardiac death

Which of the following is not true regarding B-type natriuretic peptide?

- ☐ Secreted mainly by the ventricles
- ☐ Acts as a diuretic
- ☐ Acts as a vasoconstrictor
- ☐ Levels rise in left ventricular failure
- ☐ Reduces sympathetic tone

Secreted mainly by the ventricles

14%

Acts as a diuretic

9%

Acts as a vasoconstrictor

57%

Levels rise in left ventricular failure

5%

Reduces sympathetic tone

14%

BNP - actions:

- vasodilator
- diuretic and natriuretic
- suppresses both sympathetic tone and the renin-angiotensin-aldosterone system

Important for me Less important

What is the role of troponin in cardiac muscle?

- ☐ Component of the thick filaments
- ☐ Acts as a lining of the T tubules
- ☐ Anchors thick filament to Z-discs
- ☐ Component of the thin filaments
- ☐ Anchors thick and thin filaments together

What is the role of troponin in cardiac muscle?

Component of the thick filaments

16%

Acts as a lining of the T tubules

12%

Anchors thick filament to Z-discs

8%

Component of the thin filaments

35%

Anchors thick and thin filaments together

29%

The other components of thin filaments are actin and tropomyosin. Thick filaments are primarily composed of myosin.

Dr. Assem

An 11-year-old boy who is known to have Down's syndrome is reviewed in the cardiology clinic. Over the past year his parents report that he is more tired and breathless when he plays with his peers and siblings.

On examination he appears cyanosed at rest. His pulse is 90/min with no radio-femoral delay. There is a systolic murmur and a loud second heart sound. A right ventricular heave is noted and the JVP is elevated.

What is the most likely diagnosis?

- ☐ Eisenmenger's syndrome
- ☐ Fulminant patent ductus arteriosus
- ☐ Fulminant transposition of the great arteries
- ☐ Ebstein's anomaly
- ☐ Tetralogy of Fallot with pulmonary atresia

Eisenmenger's syndrome	53%
Fulminant patent ductus arteriosus	9%
Fulminant transposition of the great arteries	6%
Ebstein's anomaly	12%
Tetralogy of Fallot with pulmonary atresia	19%

This boy is likely to have been born with a atrioventricular septal defect. Over time the shunt is likely to have reversed resulting in Eisenmenger's syndrome.

A 45-year-old female is due to undergo a dental extraction for relief of neuralgic pain. Additionally, she is having a hysterectomy in 4 weeks for a fibroid uterus with menorrhagia. She mentions to you that she has previously been diagnosed with a heart murmur and wants to know if this will affect her operation.

In regard to her valvular heart disease and associated risk, what is the most appropriate thing to advise her?

- ☐ She should have antibiotic prophylaxis at the time of hysterectomy only
- ☐ She should have antibiotic prophylaxis for both procedures
- ☐ She is not at risk of infective endocarditis so should not worry
- ☐ She is at theoretical risk of infective endocarditis but antibiotic prophylaxis is no longer advised routinely for either procedure
- ☐ She should be offered chlorhexidine mouthwash as prophylaxis when undergoing the dental extraction

She should have antibiotic prophylaxis at the time of hysterectomy only

8%

She should have antibiotic prophylaxis for both procedures

9%

She is not at risk of infective endocarditis so should not worry

13%

She is at theoretical risk of infective endocarditis but antibiotic prophylaxis is no longer advised routinely for either procedure

63%

She should be offered chlorhexidine mouthwash as prophylaxis when undergoing the dental extraction

6%

Antibiotic prophylaxis to prevent infective endocarditis is not routinely recommended in the UK for dental and other procedures

Important for me Less important

The answer to this question is based on NICE Guidance (CG64 - March 2008).

According to this guidance, as neither procedure requires prophylaxis (either antibiotics or mouthwash) the only appropriate answer here is 4: that the patient is at theoretical risk of infective endocarditis but that antibiotic prophylaxis is no longer routinely recommended.

Dr Assef

Which one of the following conditions is most associated with a bisferiens pulse?

- ☐ Cardiac tamponade
- ☐ Severe left ventricular failure
- ☐ Aortic stenosis
- ☐ Patent ductus arteriosus
- ☐ Mixed aortic valve disease

Which one of the following conditions is most associated with a bisferiens pulse?

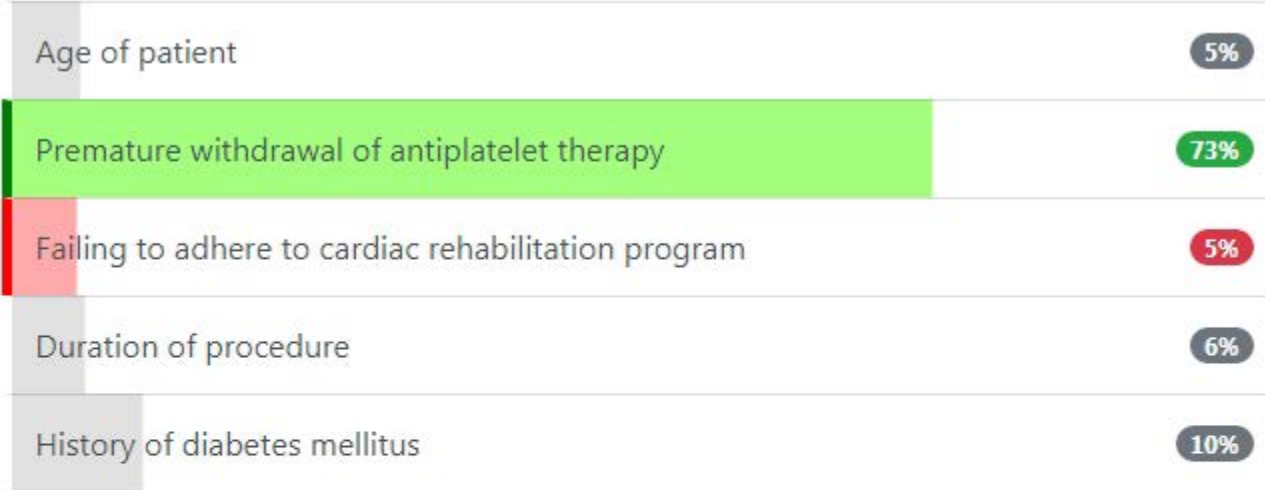


Bisferiens pulse - mixed aortic valve disease

Important for me Less important

A 54-year-old man with angina has a percutaneous coronary intervention with insertion of a drug-eluting stent. What is the single most important risk factor for stent thrombosis?

- ☐ Age of patient
- ☐ Premature withdrawal of antiplatelet therapy
- ☐ Failing to adhere to cardiac rehabilitation program
- ☐ Duration of procedure
- ☐ History of diabetes mellitus



PCI: stent thrombosis - withdrawal of antiplatelets biggest risk factor

Important for me

Less important

Diabetes mellitus is a risk factor for restenosis rather than stent thrombosis

Dr Assem

A 52-year-old man is seen in the hypertension clinic. He was diagnosed around three months ago and started on ramipril. This has been titrated up to 10mg od but his blood pressure remains around 156/92 mmHg. What is the most appropriate next step in management?

- ☐ Add bendroflumethiazide
- ☐ Add bisoprolol
- ☐ Switch ramipril to perindopril
- ☐ Add amlodipine
- ☐ Add losartan



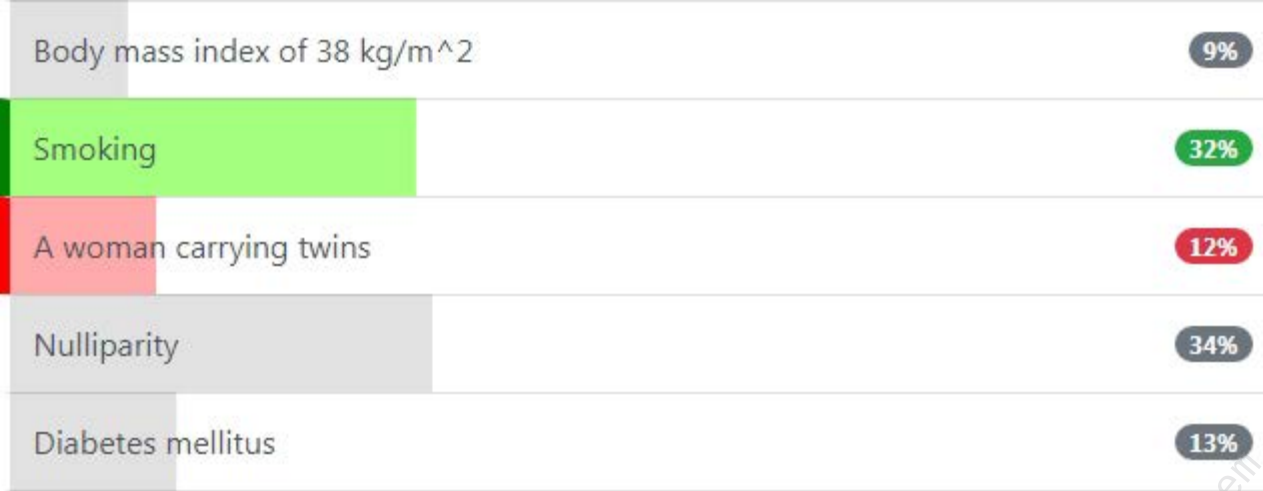
Calcium channel blockers are now preferred to thiazides in the treatment of hypertension

Important for me Less important

The 2011 NICE guidelines reflected the changing evidence base supporting the use of calcium channel blockers in preference to thiazide-type diuretics in the management of hypertension.

Which one of the following is not a risk factor for the development of pre-eclampsia?

- ☐ Body mass index of 38 kg/m²
- ☐ Smoking
- ☐ A woman carrying twins
- ☐ Nulliparity
- ☐ Diabetes mellitus



There is some evidence to suggest that pre-eclampsia is actually less common in smokers

A 34-year-old man is investigated following an unexplained collapse whilst at work. A resting ECG shows convex ST elevation in V1-V3 with a partial right bundle branch block pattern. What is the most likely diagnosis?

- ☐ Catecholaminergic polymorphic ventricular tachycardia
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Arrhythmogenic right ventricular cardiomyopathy
- ☐ Brugada syndrome
- ☐ Normal variant

Catecholaminergic polymorphic ventricular tachycardia

7%

Hypertrophic obstructive cardiomyopathy

15%

Arrhythmogenic right ventricular cardiomyopathy

22%

Brugada syndrome

52%

Normal variant

5%

Dr. Assun

An 83-year-old male presents with ischaemic sounding chest pain that has persisted for the past one hour. A 12-lead ECG is performed and shows deep T wave inversion in leads V1 and V2.

Which is the most likely implicated coronary artery?

- ☐ Left circumflex artery
- ☐ Left main stem artery
- ☐ Proximal left anterior descending artery
- ☐ Right coronary artery
- ☐ Distal left anterior descending artery

Left circumflex artery

13%

Left main stem artery

9%

Proximal left anterior descending artery

44%

Right coronary artery

17%

Distal left anterior descending artery

16%

Ischaemic changes in leads V1-V4 - left anterior descending

Important for me Less important

Wellens' syndrome is an ECG manifestation of critical proximal left anterior descending (LAD) coronary artery stenosis in patients with unstable angina. It is characterized by symmetrical, often deep (>2 mm), T wave inversions in the anterior precordial leads.

A 62-year-old female with no past medical history is admitted to hospital with a left-sided hemiparesis. Examination reveals that she is in atrial fibrillation. CT scan of her brain shows a cerebral infarction. What is the most appropriate anticoagulation strategy for this patient?

- ☐ Life-long warfarin, started immediately
- ☐ Aspirin started immediately switching to life-long warfarin after 2 weeks
- ☐ Life-long aspirin, started immediately
- ☐ Life-long aspirin started after 2 weeks
- ☐ 6 months of warfarin, started immediately

Life-long warfarin, started immediately

18%

Aspirin started immediately switching to life-long warfarin after 2 weeks

59%

Life-long aspirin, started immediately

9%

Life-long aspirin started after 2 weeks

6%

6 months of warfarin, started immediately

8%

Dr. ASSU

A 55-year-old man presents with a 2-hour history palpitations. He has no other history of note and is generally fit and well. An ECG confirms fast atrial fibrillation with a rate of 140/min. He has a fear of sedation and requests pharmacological cardioversion. Which one of the following agents is most likely to cardiovert him into sinus rhythm?

- ☐ Atenolol
- ☐ Procainamide
- ☐ Flecainide
- ☐ Disopyramide
- ☐ Digoxin

Atenolol

9%

Procainamide

10%

Flecainide

70%

Disopyramide

4%

Digoxin

7%

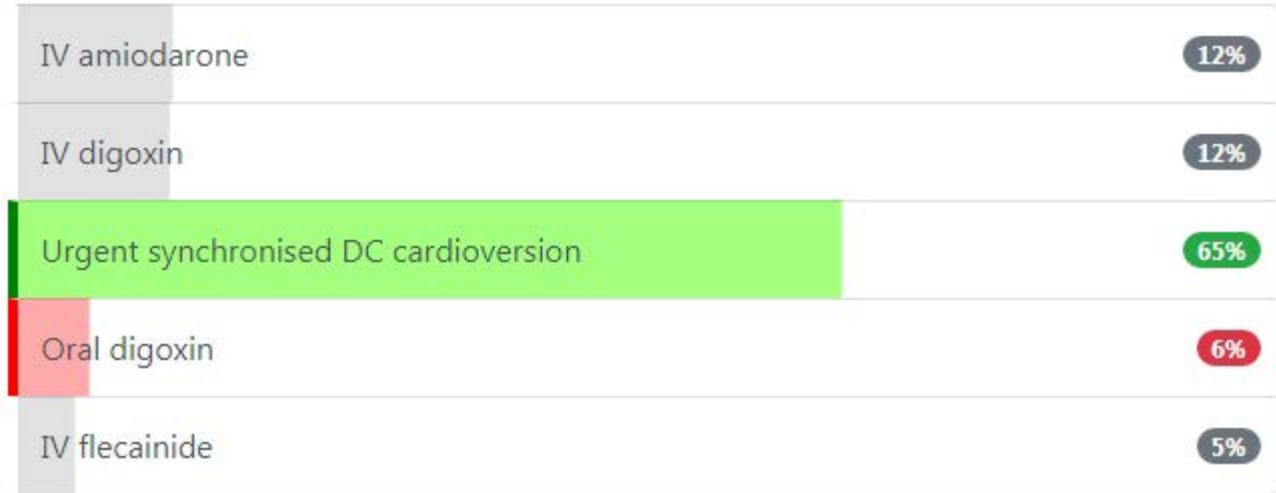
Atrial fibrillation - cardioversion: amiodarone + flecainide

Important for me

Less important

You are asked to urgently review a 61-year-old female on the cardiology ward due to difficulty in breathing. On examination she has a raised JVP with bilateral fine crackles to the mid zones. Blood pressure is 94/60 mmHg and the pulse is 140-150 and irregular. ECG confirms atrial fibrillation. What is the most appropriate management?

- ☐ IV amiodarone
- ☐ IV digoxin
- ☐ Urgent synchronised DC cardioversion
- ☐ Oral digoxin
- ☐ IV flecainide



Heart failure is one of the adverse signs indicating the need for urgent synchronised DC cardioversion

A 72-year-old man presents to the Emergency Department with a broad complex tachycardia. Which of the following features would make it more likely that this was due to a supraventricular tachycardia rather than a ventricular tachycardia?

- ☐ History of ischaemic heart disease
- ☐ Left axis deviation
- ☐ Capture beats
- ☐ Absence of QRS concordance in chest leads
- ☐ QRS complex greater than 160 ms

History of ischaemic heart disease	10%
Left axis deviation	15%
Capture beats	21%
Absence of QRS concordance in chest leads	44%
QRS complex greater than 160 ms	10%

Positive QRS concordance in the chest leads is associated with ventricular tachycardia

A 60-year-old male has a past medical history of hypertension, type II diabetes and ischaemic heart disease. He has recently been started on a new medication. His GP notices that his HbA1c has increased significantly over the same period. Which medication is most likely to have adversely affected his glycaemic control?

- ☐ Alendronic acid
- ☐ Amiodarone
- ☐ Allopurinol
- ☐ Bendroflumethiazide
- ☐ Calcium carbonate and vitamin D3

Alendronic acid	5%
Amiodarone	17%
Allopurinol	7%
Bendroflumethiazide	66%
Calcium carbonate and vitamin D3	4%

Bendroflumethiazides can worsen glucose tolerance

Important for me Less important

The correct answer is bendroflumethiazide. Thiazides can worsen glycaemic control and increase urate levels which can worsen gout. The other drugs are not known to have an effect on glycaemic control.

BNF:

<https://bnf.nice.org.uk/drug/bendroflumethiazide.html#sideEffects>

Dr Assem

A 65-year-old female with a known history of heart failure presents for an annual check-up. She is found to have a blood pressure of 170/100 mmHg. Her current medications are furosemide and aspirin. What is the most appropriate medication to add?

☐ Bendroflumethiazide

☐ Spironolactone

☐ Bisoprolol

☐ Verapamil

☐ Enalapril

Dr Assem



Both enalapril and bisoprolol have been shown to improve prognosis in patients with heart failure. Enalapril however would also be better at treating the hypertension. NICE guidelines recommend the introduction of an ACE inhibitor prior to a beta-blocker in patients with chronic heart failure

Each one of the following is associated with left axis deviation on ECG, except:

- ☐ Left anterior hemiblock
- ☐ Ostium primum ASD
- ☐ Left posterior hemiblock
- ☐ Obesity
- ☐ Left bundle branch block

Left anterior hemiblock

13%

Ostium primum ASD

20%

Left posterior hemiblock

38%

Obesity

17%

Left bundle branch block

13%

Right axis deviation - left posterior hemiblock

Important for me

Less important

A 55-year-old man with a history of ischaemic heart disease presents to the Emergency Department with palpitations for the past 10 days. Examination of his pulse reveals a rate of 130 bpm which is irregularly irregular. He has had one previous episode of atrial fibrillation 3 months ago which was terminated by elective cardioversion following warfarinisation. What term best describes his arrhythmia?

- ☐ Paroxysmal atrial fibrillation
- ☐ Atrial flutter
- ☐ Permanent atrial fibrillation
- ☐ Persistent atrial fibrillation
- ☐ Secondary atrial fibrillation

A 55-year-old man with a history of ischaemic heart disease presents to the Emergency Department with palpitations for the past 10 days. Examination of his pulse reveals a rate of 130 bpm which is irregularly irregular. He has had one previous episode of atrial fibrillation 3 months ago which was terminated by elective cardioversion following warfarinisation. What term best describes his arrhythmia?

Paroxysmal atrial fibrillation

28%

Atrial flutter

3%

Permanent atrial fibrillation

12%

Persistent atrial fibrillation

53%

Secondary atrial fibrillation

5%

Dr. Assou

A 64-year-old man with a history of type 2 diabetes mellitus is admitted with chest pain to the Emergency Department. An ECG shows ST elevation in the anterior leads and he is thrombolysed and transferred to the Coronary Care Unit (CCU). His usual medication includes simvastatin, gliclazide and metformin. How should his diabetes be managed whilst in CCU?

- ☐ Stop metformin. Continue gliclazide at a higher dose
- ☐ Stop metformin & gliclazide. Start subcutaneous insulin (basal-bolus regime)
- ☐ Continue metformin & gliclazide at same dose
- ☐ Stop metformin & gliclazide. Start intravenous insulin infusion
- ☐ Stop metformin & gliclazide. Start subcutaneous insulin (biphasic insulin regime)

Stop metformin. Continue gliclazide at a higher dose

7%

Stop metformin & gliclazide. Start subcutaneous insulin (basal-bolus regime)

19%

Continue metformin & gliclazide at same dose

8%

Stop metformin & gliclazide. Start intravenous insulin infusion

52%

Stop metformin & gliclazide. Start subcutaneous insulin (biphasic insulin regime)

14%

The benefits of tight glycaemic control following a myocardial infarction were initially established by the DIGAMI study. These findings were not repeated in the later DIGAMI 2 study. However modern clinical practice is still that type 2 diabetics are converted to intravenous insulin in the immediate period following a myocardial infarction.

NICE in 2011 recommended the following: *'Manage hyperglycaemia in patients admitted to hospital for an acute coronary syndrome (ACS) by keeping blood glucose levels below 11.0 mmol/litre while avoiding hypoglycaemia. In the first instance, consider a dose-adjusted insulin infusion with regular monitoring of blood glucose levels.'*

Dr Assem

Each one of the following may cause left bundle branch block, except:

- ☐ Cardiomyopathy
- ☐ Atrial septal defect (ostium secundum)
- ☐ Hypertension
- ☐ Idiopathic fibrosis
- ☐ Ischaemic heart disease

Cardiomyopathy

6%

Atrial septal defect (ostium secundum)

55%

Hypertension

14%

Idiopathic fibrosis

23%

Ischaemic heart disease

3%

A 55-year-old female presents to the emergency department with an eight-hour history of heart palpitations. She has a heart rate of 200 beats per minute and an ECG shows regular QRS complexes of 0.08 seconds. She has not had any chest pain or episodes of syncope and has no signs of heart failure. Her blood pressure is 130/90 mmHg and her oxygen saturations are 97% on air. What should you do first?

- ☐ Carotid sinus massage
- ☐ Adenosine 6mg
- ☐ Adenosine 12mg
- ☐ Amiodarone 300mg
- ☐ Atropine 0.5mg

Carotid sinus massage	79%
Adenosine 6mg	9%
Adenosine 12mg	4%
Amiodarone 300mg	5%
Atropine 0.5mg	3%

This female has a regular narrow complex tachycardia with no adverse features. The first step in this instance would, therefore, be to try vagal manoeuvres, for example, a carotid sinus massage. If this is unsuccessful, IV adenosine should be given (6mg at first, followed by 12mg if no response, and then by a further 12mg if again no response). If this is unsuccessful consider atrial flutter as the diagnosis and treat as appropriate.

Amiodarone can be used for rhythm control if the patients' narrow complex tachycardia is due to atrial fibrillation or atrial flutter. It could also be used in the management of broad complex tachycardia.

Atropine is used in the management of bradycardia.

Dr Assem

An 89-year-old man attends your clinic, complaining of bright spots in his vision that come and go. He has a past medical history of asthma, triple vessel coronary artery disease opting for medical management of his anginal symptoms, and has just completed a course of itraconazole for a fungal infection. His heart rate is 60bpm and blood pressure 120/70mmHg.

Which of his regular medications is most likely responsible for his symptoms?

- ☐ Amlodipine
- ☐ Bezafibrate
- ☐ Ivabradine
- ☐ Ranolazine
- ☐ Ventolin

Ivabradine	51%
Ranolazine	17%
Ventolin	6%

Ivabradine is indicated for the symptomatic relief of angina in patients with a heart rate >70, as an alternative to first line therapies. It is also indicated for the treatment of chronic heart failure (NYHA II-IV) in addition to standard therapy, in patients with a heart rate of >75.

The mode of action of ivabradine is by inhibition of If channels (known as funny channels), I = current, f =funny. These funny channels are so called because of their unusual features compared to other ion channels. They are mixed sodium and potassium channels found in spontaneously active regions of the heart such as the sinoatrial node and are triggered by hyperpolarisation. Activated funny channels allow an influx of positive ions, triggering depolarisation and are therefore responsible for the spontaneous activity of cardiac myocytes.

By inhibiting If channels ivabradine delays depolarisation in the sinoatrial node and therefore selectively slows heart rate.

Dr Assem

A 71-year-old woman is admitted with acute dyspnoea to the Emergency Department. Oxygen saturations are 94% on 28% supplementary oxygen and her respiratory rate is 30/min. A rapid B-type natriuretic peptide (BNP) assay is reported as follows:

BNP	62 pg/ml
-----	----------

What is the best interpretation of this result?

- ☐ No conclusion can be drawn from this result
- ☐ Pulmonary embolism is the most likely cause of her symptoms
- ☐ If a further BNP level is above 50 pg/ml after one hour then this is diagnostic of heart failure
- ☐ Heart failure is unlikely to be the cause of her dyspnoea
- ☐ Heart failure is highly likely to be the cause of her dyspnoea

No conclusion can be drawn from this result

10%

Pulmonary embolism is the most likely cause of her symptoms

8%

If a further BNP level is above 50 pg/ml after one hour then this is diagnostic of heart failure

5%

Heart failure is unlikely to be the cause of her dyspnoea

64%

Heart failure is highly likely to be the cause of her dyspnoea

13%

A 72-year-old man with a history of chronic heart failure secondary to ischaemic cardiomyopathy is reviewed. He was discharged two weeks ago from hospital following a myocardial infarction. An echocardiogram done during his admission showed a left ventricular ejection fraction of 40% but did not demonstrate any valvular problems.

Despite his current treatment with furosemide, ramipril, carvedilol, aspirin and simvastatin he remains short of breath on minimal exertion such as walking 30 metres. On examination his chest is clear and there is minimal peripheral oedema. What is the most appropriate next step in management?

- ☐ Stop aspirin
- ☐ Refer for cardiac resynchronisation therapy
- ☐ Switch carvedilol to bisoprolol
- ☐ Add angiotensin-2 receptor blocker
- ☐ Add an aldosterone antagonist



The updated 2010 NICE guidelines now suggest that in addition to aldosterone antagonists both angiotensin-2 receptor blockers and hydralazine in combination with a nitrate are suitable second-line treatments for heart failure. However, given that he has had a recent myocardial infarction the best choice is an aldosterone antagonist - please see the NICE guidelines for more details.

A 76-year-old woman is admitted with palpitations. During the cardiovascular examination you notice irregular cannon 'a' waves. Which one of the following would account for this finding?

- ☐ Atrio-ventricular nodal re-entry tachycardia
- ☐ Atrial fibrillation with tricuspid stenosis
- ☐ Ventricular tachycardia with 1:1 ventricular-atrial conduction
- ☐ Complete heart block
- ☐ Tricuspid regurgitation

A 76-year-old woman is admitted with palpitations. During the cardiovascular examination you notice irregular cannon 'a' waves. Which one of the following would account for this finding?

Atrio-ventricular nodal re-entry tachycardia

12%

Atrial fibrillation with tricuspid stenosis

13%

Ventricular tachycardia with 1:1 ventricular-atrial conduction

6%

Complete heart block

51%

Tricuspid regurgitation

17%

A 63-year-old female is brought to the Emergency Department due to a decreased level of consciousness. An urgent CT head is performed as she takes warfarin for atrial fibrillation and shows an intracranial haemorrhage. What is the most appropriate management?

- ☐ Protamine sulphate
- ☐ IV vitamin K alone
- ☐ IV vitamin K + prothrombin complex concentrate
- ☐ Fresh frozen plasma alone
- ☐ IV vitamin K + fresh frozen plasma

Protamine sulphate

4%

IV vitamin K alone

7%

IV vitamin K + prothrombin complex concentrate

70%

Fresh frozen plasma alone

5%

IV vitamin K + fresh frozen plasma

14%

Major bleeding - stop warfarin, give intravenous vitamin K 5mg, prothrombin complex concentrate

Important for me · Less important

As fresh frozen plasma takes time to defrost prothrombin complex concentrate (PCC) should be used in such an urgent situation. The use of PCC is currently limited by availability

Dr Assem

A 66-year-old man with no past medical history of note presents with central chest pain to the Emergency Department. An ECG shows ST elevation in the anterior leads. He is given aspirin and ticagrelor before going for a percutaneous coronary intervention. What is the mechanism of action of ticagrelor?

- ☐ Inhibits ATP binding to its platelet receptor
- ☐ Glycoprotein IIb/IIIa inhibitor
- ☐ Phosphodiesterase V inhibitor
- ☐ Non-selective phosphodiesterase inhibitor
- ☐ Inhibits ADP binding to its platelet receptor

Inhibits ATP binding to its platelet receptor

11%

Glycoprotein IIb/IIIa inhibitor

17%

Phosphodiesterase V inhibitor

6%

Non-selective phosphodiesterase inhibitor

4%

Inhibits ADP binding to its platelet receptor

61%

Ticagrelor has a similar mechanism of action to clopidogrel - inhibits ADP binding to platelet receptors

Important for me Less important

Which of the following conditions is least associated with coarctation of the aorta?

- ☐ Neurofibromatosis
- ☐ Bicuspid aortic valve
- ☐ Prader-Willi syndrome
- ☐ Turner's syndrome
- ☐ Berry aneurysms

Which of the following conditions is least associated with coarctation of the aorta?

Neurofibromatosis

29%

Bicuspid aortic valve

9%

Prader-Willi syndrome

38%

Turner's syndrome

6%

Berry aneurysms

18%

Dr. AS

A 74-year-old man is admitted with chest pain associated with ECG changes. A troponin T taken 12 hours after admission indicates an acute myocardial infarction. Which one of the following is most likely to predict a poor prognosis?

- ☐ History of diabetes mellitus
- ☐ Loss of heart rate variability
- ☐ Left ventricular ejection fraction of 40%
- ☐ Diastolic blood pressure of 110 mmHg
- ☐ Male sex

History of diabetes mellitus

11%

Loss of heart rate variability

18%

Left ventricular ejection fraction of 40%

53%

Diastolic blood pressure of 110 mmHg

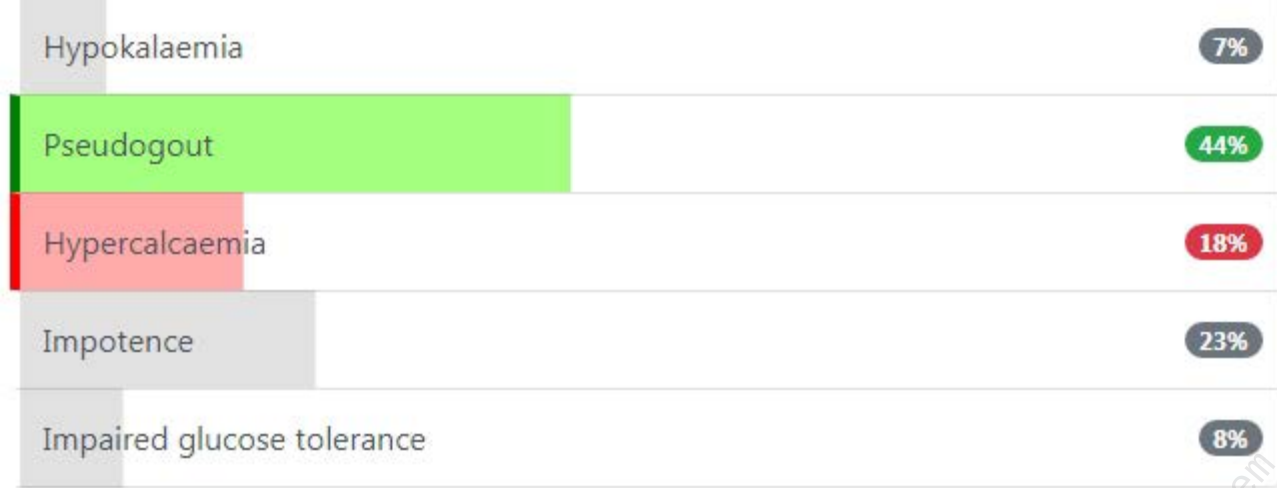
10%

Male sex

8%

Which one of the following is least recognised as an adverse effect of taking bendroflumethiazide?

- ☐ Hypokalaemia
- ☐ Pseudogout
- ☐ Hypercalcaemia
- ☐ Impotence
- ☐ Impaired glucose tolerance



Bendroflumethiazide predisposes to gout, rather than pseudogout

A 65-year-old woman complains of chest pain on exertion such as when walking up the stairs or doing housework. She describes the pain as a constricting discomfort in front of the chest. The pain typically radiates to the left shoulder and disappears on resting.

She suffers from severe osteoarthritis of the left knee, which limits her mobility. She also suffers from brittle asthma and high blood pressure. Her last cholesterol check was 4 years ago and this was normal. She is a non-smoker. On examination, she appears well and pain-free. Heart sounds were normal with no murmur. Resting ECG is normal.

What is the next step in the investigation of this lady's symptoms?

- ☐ Check her cholesterol level to determine the investigation of choice
- ☐ Exercise (stress) echocardiogram
- ☐ Contrast-enhanced coronary CT angiography
- ☐ Adenosine stress-CMR
- ☐ Invasive coronary angiography

Contrast-enhanced coronary CT angiography

46%

Adenosine stress-CMR

11%

Invasive coronary angiography

11%

Contrast-enhanced CT coronary angiogram is the first line investigation for stable chest pain of suspected coronary artery disease aetiology

Important for me Less important

This lady chest pain characteristics are consistent with typical angina. The first-line investigation recommended by NICE is contrast-enhanced CT coronary angiogram cCTA. The new NICE guideline no longer recommends using pre-test likelihood of the CAD to determine the appropriate first-line investigation.

This lady may not be suitable for exercise (stress) echocardiogram as she suffers from severe osteoarthritis of the knee. Stress echocardiogram with dobutamine may be appropriate but is less sensitive than cCTA (and is not an option for this question). Adenosine stress-CMR is very sensitive in detecting CAD but the use of adenosine in someone with asthma is contraindicated due to the risk of bronchospasm. Immediate invasive coronary angiography is typically not the first-line investigation method due to the cost and possible complications. The use of invasive angiography without a 'gatekeeper' non-invasive test is not recommended by NICE but is still recommended by ESC and AHA in patients with very high pre-test likelihood of CAD. Other than her age and hypertension, she does not have other cardiovascular risk factors e.g. smoking, diabetes, etc.

A 71-year-old man with a history of ischaemic heart disease is brought to the Emergency Department following a 'collapse'. He now feels back to normal. The ECG shows sinus rhythm, 94/min with left bundle branch block. Given the ECG findings, which one of the following is most likely to be found on auscultation of the heart?

- ☐ Fixed split S2
- ☐ Loud S1
- ☐ Third heart sound (S3)
- ☐ Widely split S2
- ☐ Reversed split S2

Fixed split S2

13%

Loud S1

6%

Third heart sound (S3)

19%

Widely split S2

16%

Reversed split S2

46%

Second heart sound (S2)

- loud: hypertension
- soft: AS
- fixed split: ASD
- reversed split: LBBB

Important for me Less important

You are an SHO working at district general hospital in Cornwall. A 56-year-old man presents to the emergency department with crushing central chest pain that started 30 minutes ago. His ECG demonstrates ST elevation in the anterior leads and he is treated for an ST-elevation myocardial infarction (STEMI). So far he has been given aspirin, clopidogrel, low-molecular weight heparin (LMWH) and his chest pain has significantly improved with sublingual GTN and IV morphine + metoclopramide. There is no cath-lab on site and the nearest percutaneous coronary intervention (PCI) centre in Truro is approximately 2 ½ hours away. Which of the following is the most appropriate course of action?

- ☐ Transfer to PCI centre
- ☐ Give bivalirudin
- ☐ Start infusion of unfractionated heparin and transfer to PCI centre
- ☐ Give alteplase
- ☐ Give ticagrelor

Give alteplase

57%

Give ticagrelor

4%

In management of STEMI if primary PCI cannot be delivered within 120 minutes then thrombolysis should be given

Important for me Less important

In the management of STEMI fibrinolysis with a drug such as alteplase should be offered if primary PCI cannot be delivered within 120 minutes of the time when fibrinolysis could have been given.

This problem is most often encountered when a patient initially presents to a district general hospital that lacks a PCI centre. Ambulances are generally directed to PCI centres in cases of chest pain and this has reduced the frequency with which this occurs.

If a repeat ECG at 90 minutes does not show resolution of ST elevation the patient will require transfer to a PCI centre regardless.

1- This is inappropriate. The transfer time is over 120 minutes from when fibrinolysis could be given. This would therefore be an unacceptable delay.

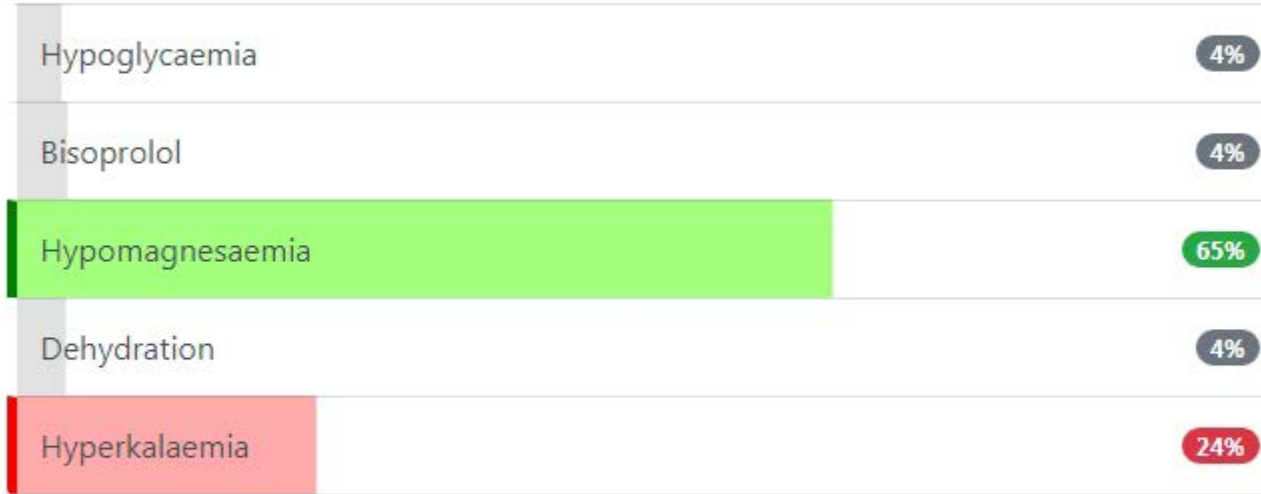
2- This is a direct thrombin inhibitor. It has a role in STEMI management but would not address the main issue which is the need for PCI/fibrinolysis.

3- Though sometimes used in STEMI again, fibrinolysis or PCI are needed. Additionally,

You are called to the coronary care unit. A patient who has been admitted following a myocardial infarction has developed a broad complex tachycardia. You suspect a diagnosis of polymorphic ventricular tachycardia. Which one of the following factors is most likely to have precipitated this?

- ☐ Hypoglycaemia
- ☐ Bisoprolol
- ☐ Hypomagnesaemia
- ☐ Dehydration
- ☐ Hyperkalaemia

You are called to the coronary care unit. A patient who has been admitted following a myocardial infarction has developed a broad complex tachycardia. You suspect a diagnosis of polymorphic ventricular tachycardia. Which one of the following factors is most likely to have precipitated this?



Hypokalemia is the most important cause of ventricular tachycardia (VT) clinically, followed by hypomagnesaemia. Severe hyperkalaemia may cause VT in certain circumstances, for example in patients with structural heart disease, but it is not as common a cause as hypomagnesaemia.

Dr Assem

A 62-year-old man comes for review. In the past month he has had two episodes of 'passing out'. The first occurred whilst going upstairs. The second occurred last week whilst he was getting out of a swimming pool. There were no warning signs prior to these episodes. He was told by people who witnessed the episode last week that he was only 'out' for around 15 seconds. He reports feeling 'groggy' for only a few seconds after the episode. On examination pulse is 90 / minute, blood pressure 110/86 mmHg, his lungs are clear and there is a systolic murmur which radiates to the carotid area. Which one of the following investigations should be arranged first?

- ☐ 24 hour ECG monitor
- ☐ Echocardiogram
- ☐ Exercise tolerance test
- ☐ CT head
- ☐ Carotid doppler

24 hour ECG monitor

15%

Echocardiogram

67%

Exercise tolerance test

4%

CT head

4%

Carotid doppler

10%

The systolic murmur may be a pointer to aortic stenosis (AS). Syncope is a late sign and typically occurs on exertion in patients with AS. It is therefore important to exclude this condition as a priority.

An exercise tolerance test would be contraindicated in a patient with suspected aortic stenosis.

A 56-year-old man with a past history of ischaemic heart disease is admitted with central chest pain radiating to his left arm associated with nausea. On arrival in the Coronary Care Unit he is noted to be in complete heart block. Which coronary artery is likely to be affected?

- ☐ Circumflex
- ☐ Right coronary
- ☐ Obtuse marginal
- ☐ Left anterior descending
- ☐ Posterior descending



The right coronary artery supplies the atrioventricular node in 90% of patients

A 60-year-old man who is investigated for exertional chest pain is diagnosed as having angina pectoris. Which one of the following drugs is most likely to improve his long-term prognosis?

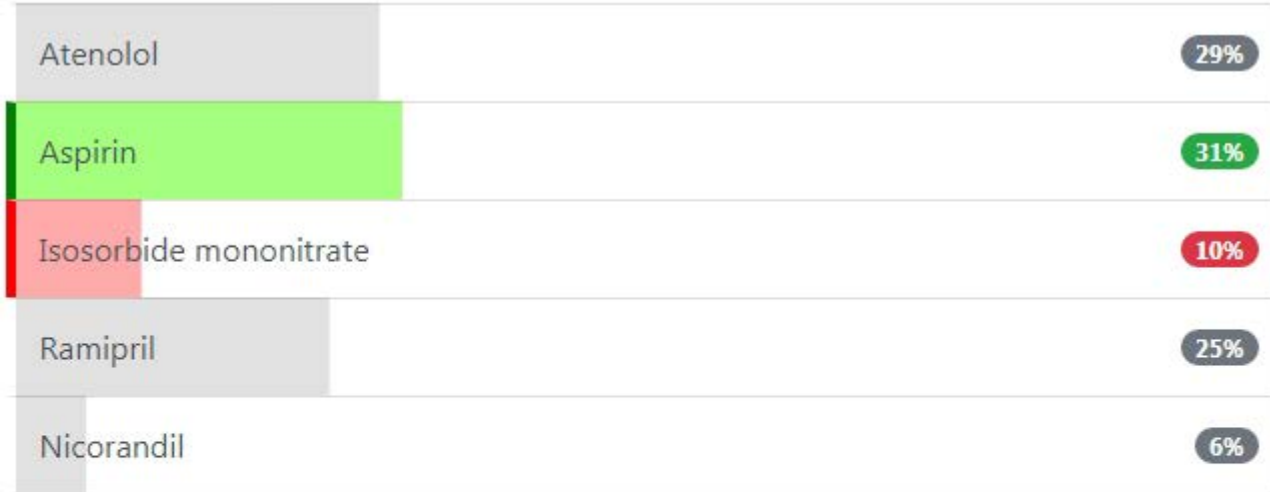
☐ Atenolol

☐ Aspirin

☐ Isosorbide mononitrate

☐ Ramipril

☐ Nicorandil



Strong evidence exists supporting the use of aspirin in stable angina. The benefit of ACE inhibitors and beta-blockers are significant in patients who've had a myocardial infarction but modest in those with stable angina. Please see the CKS link for a review of the most recent trials.

An 84-year-old female has become progressively more short of breath over the past 2 months. She is finding it difficult to breathe when lying down and so has been sleeping upright in her chair for the past two weeks. She also has a cough productive of frothy sputum and swollen legs. What is the most likely description of her pulse?

☐ Pulsus alternans

☐ Collapsing

☐ Jerky

☐ Slow rising

☐ Pulsus bisferiens

Pulsus alternans	48%
Collapsing	14%
Jerky	8%
Slow rising	13%
Pulsus bisferiens	17%

Pulsus alternans - seen in left ventricular failure

Important for me Less important

Pulsus alternans is when the upstroke of the pulse alternates between strong and weak. It indicates systolic dysfunction and is seen in patients with heart failure.

A collapsing pulse has a forceful rapid upstroke AND descent.

A jerky pulse is characterised by a rapid forceful upstroke.

A slow-rising pulse has a slow upstroke.

A bisferiens pulse occurs when there are two sharp upstrokes during systole.

Which one of the following features is not part of the modified Duke criteria used in the diagnosis of infective endocarditis?

- ☐ Prolonged PR interval
- ☐ Positive serology for *Coxiella burnetii*
- ☐ Fever $> 38^{\circ}\text{C}$
- ☐ Roth spots
- ☐ Positive microbiology from embolic fragments

Prolonged PR interval	49%
Positive serology for <i>Coxiella burnetii</i>	21%
Fever > 38°C	5%
Roth spots	11%
Positive microbiology from embolic fragments	14%

A prolonged PR interval is part of the diagnostic criteria of rheumatic fever. The modified Duke criteria have now been adopted in the latest guidelines from the European Society of Cardiology. Details can be found in the link below

Which part of the jugular venous waveform is associated with the fall in atrial pressure during ventricular systole?

☐ y descent

☐ v wave

☐ x descent

☐ c wave

☐ a wave

y descent

24%

v wave

10%

x descent

48%

c wave

10%

a wave

8%

JVP: x descent = fall in atrial pressure during ventricular systole

Important for me Less important

A 37-year-old who is 38 weeks pregnancy is an inpatient on the obstetric ward for the management of pre-eclampsia. Blood pressure is 172/114 mmHg and urine dipstick shows proteinuria +++. A decision has been made to start magnesium sulphate therapy as she is deemed at risk of eclampsia. Of the following options, which are the most important parameters to monitor whilst the patient is receiving magnesium?

- ☐ Blood sugar + pulse rate
- ☐ Reflexes + respiratory rate
- ☐ Blood sugar + respiratory rate
- ☐ Reflexes + pulse rate
- ☐ Glasgow coma scale + pulse rate

Blood sugar + pulse rate

6%

Reflexes + respiratory rate

55%

Blood sugar + respiratory rate

5%

Reflexes + pulse rate

26%

Glasgow coma scale + pulse rate

8%

Magnesium sulphate - monitor reflexes + respiratory rate

Important for me

Less important

Dr Assem

A 17-year-old girl is brought into resus in cardiac arrest. On admission she is in asystole and attempts to resuscitate are unsuccessful. She collapsed whilst competing in a 1,500m race at college. The only past medical of note was asthma for which she occasionally used a salbutamol inhaler. There is no relevant family history. What is the most likely underlying cause of death?

- ☐ Long QT syndrome
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Catecholaminergic polymorphic ventricular tachycardia
- ☐ Brugada syndrome
- ☐ Arrhythmogenic right ventricular dysplasia

Long QT syndrome	13%
Hypertrophic obstructive cardiomyopathy	59%
Catecholaminergic polymorphic ventricular tachycardia	14%
Brugada syndrome	7%
Arrhythmogenic right ventricular dysplasia	7%

HOCM is the most common cause of sudden cardiac death in the young

Important for me Less important

Hypertrophic obstructive cardiomyopathy (HOCM) is a more common cause of sudden cardiac death than arrhythmogenic right ventricular dysplasia (ARVD).

Catecholaminergic polymorphic ventricular tachycardia (CPVT) is a form of inherited cardiac disease which is also associated with sudden cardiac death. It is inherited in an autosomal dominant fashion and has a prevalence of around 1:10,000.

Brugada syndrome is a form of inherited cardiovascular disease which again may present with sudden cardiac death. It is inherited in an autosomal dominant fashion and has an estimated prevalence of 1:5,000-10,000. Brugada syndrome is more common in Asians.

Which one of the following ECG findings is least associated with digoxin use?

- ☐ Bradycardia
- ☐ Down-sloping ST depression
- ☐ Flattened T waves
- ☐ Prolonged QT interval
- ☐ AV block

Bradycardia

7%

Down-sloping ST depression

15%

Flattened T waves

16%

Prolonged QT interval

50%

AV block

12%

A 49-year-old female is admitted to the Emergency Department with shortness of breath. On examination the pulse is 114 bpm with blood pressure 106/66 mmHg, temperature 37.7°C and respiratory rate 30/min. Examination of the cardiorespiratory system is unremarkable with a peak expiratory flow rate of 400 l/min. Arterial blood gases on air reveal:

pH	7.41
pCO ₂	4.0 kPa
pO ₂	7.2 kPa

Following the initiation of oxygen therapy, what is the next most important step in management?

- ☐ IV aminophylline
- ☐ IV hydrocortisone
- ☐ Low molecular weight heparin
- ☐ IV fluids
- ☐ IV co-trimoxazole

IV aminophylline	5%
IV hydrocortisone	13%
Low molecular weight heparin	64%
IV fluids	13%
IV co-trimoxazole	5%

Patients with a suspected pulmonary embolism should be initially managed with low-molecular weight heparin

Important for me Less Important

Type 1 respiratory failure in a tachycardic, tachypnoeic female with an absence of chest signs points towards a diagnosis of pulmonary embolism.

Low-grade pyrexia is common in pulmonary embolism.

Which one of the following non-invasive methods provides the most accurate assessment of whether a patient has coronary artery disease?

- ☐ Contrast enhanced cardiac CT
- ☐ Cardiac MRI with gadolinium
- ☐ Exercise ECG
- ☐ Cardiac SPECT with reversibility studies
- ☐ Transoesophageal echocardiography

Contrast enhanced cardiac CT

39%

Cardiac MRI with gadolinium

19%

Exercise ECG

15%

Cardiac SPECT with reversibility studies

23%

Transoesophageal echocardiography

5%

A 30-year-old female patient tells you that she is planning to become pregnant over the next year. You note from her records that she has a history of ventricular septal defect. Which one of the following would represent a contraindication to her becoming pregnant?

- ☐ Aortic regurgitation
- ☐ Having a perimembranous rather than a muscular defect
- ☐ A previous episode of infective endocarditis
- ☐ Pulmonary hypertension
- ☐ A history of previous surgical repair

Aortic regurgitation

7%

Having a perimembranous rather than a muscular defect

9%

A previous episode of infective endocarditis

4%

Pulmonary hypertension

77%

A history of previous surgical repair

3%

Women with pulmonary hypertension should avoid becoming pregnant due to very high mortality levels

Important for me Less important

The most common cause of restrictive cardiomyopathy in the UK is:

- ☐ Diabetes mellitus
- ☐ Systemic lupus erythematosus
- ☐ Haemochromatosis
- ☐ Tuberculosis
- ☐ Amyloidosis

Diabetes mellitus

10%

Systemic lupus erythematosus

12%

Haemochromatosis

22%

Tuberculosis

6%

Amyloidosis

50%

Restrictive cardiomyopathy: amyloid (most common), haemochromatosis, Loffler's syndrome, sarcoidosis, scleroderma

Important for me Less important

You receive the blood results of a 76-year-old man who takes warfarin following a pulmonary embolism two months ago. He recently completed a course of antibiotics.

INR	8.4
-----	-----

On reviewing the patient he is well with no bleeding or bruising. What is the most appropriate action?

- ☐ Stop warfarin + restart when INR < 5.0 + give low-molecular weight heparin until warfarin restarted
- ☐ Oral vitamin K 5mg + stop warfarin + repeat INR after 24 hours
- ☐ Stop warfarin + restart when INR < 3.0
- ☐ Stop warfarin + restart when INR < 5.0
- ☐ Fresh frozen plasma + restart warfarin when INR < 5.0

Stop warfarin + restart when INR < 5.0 + give low-molecular weight heparin until warfarin restarted

9%

Oral vitamin K 5mg + stop warfarin + repeat INR after 24 hours

53%

Stop warfarin + restart when INR < 3.0

14%

Stop warfarin + restart when INR < 5.0

18%

Fresh frozen plasma + restart warfarin when INR < 5.0

5%

INR > 8.0 (no bleeding) - stop warfarin, give oral vitamin K 1-5mg, repeat dose of vitamin K if INR high after 24 hours, restart when INR < 5.0

Important for me Less important

The BNF recommends a dose of between 1 to 5mg of vitamin K in this situation.

A 54-year-old man is admitted following a myocardial infarction associated with ST elevation. He is treated with thrombolysis and does not undergo angioplasty. What advice should he be given regarding driving?

- ☐ Can continue driving but must inform DVLA
- ☐ Cannot drive until an angiogram has been performed and reviewed by a cardiologist
- ☐ Cannot drive for 1 week
- ☐ Cannot drive for 4 weeks
- ☐ Cannot drive for 12 weeks

Can continue driving but must inform DVLA

5%

Cannot drive until an angiogram has been performed and reviewed by a cardiologist

11%

Cannot drive for 1 week

23%

Cannot drive for 4 weeks

55%

Cannot drive for 12 weeks

6%

DVLA advice post MI - cannot drive for 4 weeks

Important for me

Less important

A 45-year-old man presents with chest pain and breathlessness on exertion. On examination, he is bradycardic with a rate of 31 bpm. You notice irregular canon 'a' waves in the JVP.

What underlying diagnosis is associated with this JVP waveform pattern?

- ☐ Complete heart block
- ☐ Ventricular tachycardia
- ☐ Atrio-ventricular nodal re-entry tachycardia
- ☐ Tricuspid stenosis
- ☐ Atrial flutter

Complete heart block

77%

Ventricular tachycardia

5%

Atrio-ventricular nodal re-entry tachycardia

7%

Tricuspid stenosis

8%

Atrial flutter

3%

Irregular cannon 'a' waves points towards complete heart block

Important for me [Less important](#)

Once the JVP waveform pattern is identified as canon 'a' waves, irregularity can identify the underlying rhythm.

You are a CT1 in Acute Medicine covering the hospital at night. You are called to the surgical ward to see a 35-year-old patient who is reporting palpitations. She is known to have Wolff-Parkinson-White syndrome. Her ECG shows fast atrial fibrillation. On examination, there is no evidence of haemodynamic instability. What is the most appropriate pharmacological management option for this patient?

☐ Adenosine

☐ Verapamil

☐ Metoprolol

☐ Digoxin

☐ Flecainide

Adenosine	12%
Verapamil	12%
Metoprolol	25%
Digoxin	8%
Flecainide	43%

In patients with accessory pathways, such as those with Wolff-Parkinson-White syndrome, AV nodal blocking drugs should be avoided in atrial fibrillation. This is because blocking the AV node may enhance the rate of conduction through the accessory pathway, causing atrial fibrillation to degenerate into ventricular fibrillation (VF).

Verapamil exerts the most reliable and long-lasting effect on AV node refractoriness and therefore is the most contra-indicated in this scenario. Adenosine has a similar effect and has also been associated with precipitating VF in pre-excited atrial fibrillation.

Beta-blockers and digoxin also inhibit AV node conduction.

Flecainide is a sodium channel blocker (Class Ic anti-arrhythmic) which will reduce the excitability of the atrial and ventricular myocardium without AV nodal blockade.

A 65-year-old man is admitted with palpitations. The ECG shows a ventricular rate of 150/min with an underlying atrial rate of 300/min. A diagnosis of atrial flutter is suspected. What is the treatment of choice to permanently restore sinus rhythm?

- ☐ Radiofrequency ablation of the accessory pathway
- ☐ Radiofrequency ablation of the AV node
- ☐ Radiofrequency ablation of the tricuspid valve isthmus
- ☐ Lifelong amiodarone
- ☐ Permanent pacemaker

Radiofrequency ablation of the accessory pathway

26%

Radiofrequency ablation of the AV node

19%

Radiofrequency ablation of the tricuspid valve isthmus

36%

Lifelong amiodarone

8%

Permanent pacemaker

11%

A 57-year-old man comes to the emergency department with severe, central, crushing chest pain. By the time he arrives on the medical admissions unit he is pain-free.

He had a myocardial infarction (MI) two years ago; additionally he has type 2 diabetes mellitus, hypertension and hypercholesterolaemia. His brother died of a MI at a similar age. His repeat prescriptions include aspirin, metformin, ramipril, amlodipine and atorvastatin.

On examination he looks pale and sweaty. On auscultation he has vesicular breathing and normal heart sounds. He is overweight.

His oxygen saturations are 98% on air; respiratory rate 14 breaths per minute; blood pressure 150/88 mmHg, heart rate 90 beats per minute. His blood sugar (BM) is 22.5.

There are no ischaemic changes on his ECG; however a 12 hour troponin is elevated. The admitting doctor has already given aspirin, clopidogrel and fondaparinux.

What is the next step in the management of this patient?

- ☐ IV GTN infusion
- ☐ 15L oxygen via non-rebreathe mask
- ☐ Primary PCI within 4 hours
- ☐ Additional dose metformin

IV GTN infusion	6%
15L oxygen via non-rebreathe mask	2%
Primary PCI within 4 hours	25%
Additional dose metformin	4%
Angiography within 96 hours	63%

This man is having a NSTEMI. His myriad risk factors categorise him as high risk, and therefore he should have definitive angiography +/- stenting within 96 hours. He is maintaining his oxygen saturations, is pain free and has no ST elevation, making the other options incorrect. Metformin is actually best avoided in acute tissue ischaemia due to its association with lactic acidosis.

See <http://nice.org.uk/guidance/cg94> for current NICE guidelines on management of NSTEMI.

A 70 year-old man presents with a history of chest pain on exertion. He is known to have hypertension, currently treated with amlodipine, and he is also on simvastatin for primary prevention. The chest pain is dull in nature and is relieved within a few minutes of rest. His symptoms have been relieved by the use of his wife's GTN.

Which additional medication would be indicated here?

- ☐ Doxazosin
- ☐ Verapamil
- ☐ Isosorbide mononitrate
- ☐ Atenolol
- ☐ Ivabradine

Doxazosin

3%

Verapamil

5%

Isosorbide mononitrate

36%

Atenolol

49%

Ivabradine

7%

A beta-blocker or a calcium channel blocker is used first-line to prevent angina attacks

Important for me Less important

This man presents with classic features of angina. He is already taking a calcium channel blocker for hypertension, so the next most appropriate treatment would be a beta blocker. Verapamil would be an alternative if he wasn't taking any other medications.

Doxazosin is an alpha blocker used in refractory hypertension. Isosorbide mononitrate and ivabradine are used in the management of angina, but not at this stage.

Dr Assem

A 74-year-old man with symptomatic aortic stenosis is reviewed in the cardiology clinic. He is otherwise fit and well and keen for intervention if possible. What type of intervention is he most likely to be offered?

- ☐ Annual echocardiography, intervention when valve gradient > 75 mmHg
- ☐ Aortic bypass graft
- ☐ Bioprosthetic aortic valve replacement
- ☐ Balloon valvuloplasty
- ☐ Mechanical aortic valve replacement

Annual echocardiography, intervention when valve gradient > 75 mmHg	8%
Aortic bypass graft	2%
Bioprosthetic aortic valve replacement	55%
Balloon valvuloplasty	15%
Mechanical aortic valve replacement	20%

Prosthetic heart valves - mechanical valves last longer and tend to be given to younger patients

Important for me Less important

A 31-year-old woman of Malaysian origin presents with headache, malaise and joint pains. For the past few months she has also experienced pain in the calves after walking any significant distance. On examination her pulse is 78/min and blood pressure in the left arm is noted to be 154/98 mmHg. Due to this raised reading it is measured in the right arm and found to be 132/80 mmHg. An early diastolic murmur is noted in aortic area and a bruit is present in the carotids. Examination of the respiratory system is unremarkable. What is the most likely diagnosis?

- ☐ Coarctation of the aorta
- ☐ Supravalvular aortic stenosis
- ☐ Takayasu's arteritis
- ☐ Buerger's disease
- ☐ Polyarteritis nodosa

Coarctation of the aorta

27%

Supravalvular aortic stenosis

5%

Takayasu's arteritis

57%

Buerger's disease

6%

Polyarteritis nodosa

5%

The early diastolic murmur is caused by aortic regurgitation, which is seen in around 20% of patients with Takayasu's arteritis.

Which of the following factors is most strongly associated with risk of sudden death in the first six months after myocardial infarction?

- ☐ Ventricular ectopics
- ☐ Cigarette smoking
- ☐ 3-vessel coronary disease at angiography
- ☐ Low left ventricular ejection fraction
- ☐ High LDL (low density lipoprotein) cholesterol

Ventricular ectopics

19%

Cigarette smoking

9%

3-vessel coronary disease at angiography

18%

Low left ventricular ejection fraction

50%

High LDL (low density lipoprotein) cholesterol

4%

The most important factor predicting outcomes post-STEMI is the presence of new systolic heart failure. It suggests that a large amount of myocardial damage. Those with systolic heart failure post MI can be up to 10x more likely to die than those that do not have an MI.

A 62-year-old man is referred from the Emergency Department with a pulse of 40 beats/min. Which one of the following factors carries the least risk of asystole when risk stratifying the patient?

- ☐ Ventricular pause of 5 seconds
- ☐ Recent asystole
- ☐ Complete heart block with a narrow complex QRS
- ☐ Mobitz type II AV block
- ☐ Complete heart block with a broad complex QRS

Ventricular pause of 5 seconds

13%

Recent asystole

5%

Complete heart block with a narrow complex QRS

45%

Mobitz type II AV block

27%

Complete heart block with a broad complex QRS

10%

Complete heart block with a narrow complex QRS complex carries the least risk of asystole as the atrioventricular junctional pacemaker may provide an haemodynamically acceptable and stable heart rate. The other four factors are indications for transvenous pacing

A 55-year-old man is admitted with central chest pain. His ECG shows ST depression in the inferior leads and the chest pain requires intravenous morphine to settle. Past medical history includes a thrombolysed myocardial infarction 2 years ago, asthma and type 2 diabetes mellitus. Treatment with aspirin, clopidogrel and unfractionated heparin is commenced. Which one of the following factors should determine if an intravenous glycoprotein IIb/IIIa receptor antagonist is to be given?

- ☐ High GRACE (Global Registry of Acute Cardiac Events) risk score + whether a percutaneous coronary intervention is to be performed
- ☐ Degree of ST depression
- ☐ High GRACE (Global Registry of Acute Cardiac Events) risk score
- ☐ Presence of a left ventricular thrombus
- ☐ The presence of recurrent cardiac chest pain

High GRACE (Global Registry of Acute Cardiac Events) risk score + whether a percutaneous coronary intervention is to be performed

68%

Degree of ST depression

3%

High GRACE (Global Registry of Acute Cardiac Events) risk score

16%

Presence of a left ventricular thrombus

7%

The presence of recurrent cardiac chest pain

6%

A 50-year-old man is admitted to Resus with a suspected anterior myocardial infarction. An ECG on arrival confirms the diagnosis and thrombolysis is prepared. The patient is stable and his pain is well controlled with intravenous morphine. Clinical examination shows a blood pressure of 140/84 mmHg, pulse 90 bpm and oxygen saturations on room air of 97%. What is the most appropriate management with regards to oxygen therapy?

- ☐ 2-4 l/min via nasal cannulae
- ☐ No oxygen therapy
- ☐ 15 l/min via reservoir mask
- ☐ 28% via Venturi mask
- ☐ 35% via Venturi mask

2-4 l/min via nasal cannulae

4%

No oxygen therapy

89%

15 l/min via reservoir mask

3%

28% via Venturi mask

2%

35% via Venturi mask

2%

Please see the note below and provided link - there are now specific guidelines relating to the use of oxygen in emergency situations.

Dr Assem

Which one of the following statements is not correct regarding hypertension in pregnancy?

- An increase above booking readings of > 30 mmHg systolic or > 15 mmHg diastolic suggests hypertension
- Pre-eclampsia occurs in around 5% of pregnancies
- Urine dipstick showing protein + is consistent with gestational hypertension
- A rise in blood pressure before 20 weeks suggests pre-existing hypertension
- With gestational hypertension the blood pressure rises in the second half of pregnancy

An increase above booking readings of > 30 mmHg systolic or > 15 mmHg diastolic suggests hypertension

8%

Pre-eclampsia occurs in around 5% of pregnancies

7%

Urine dipstick showing protein + is consistent with gestational hypertension

56%

A rise in blood pressure before 20 weeks suggests pre-existing hypertension

16%

With gestational hypertension the blood pressure rises in the second half of pregnancy

12%

Proteinuria suggests pre-eclampsia

Dr Assem

A 19-year-old man collapses and dies whilst playing rugby at university. At post-mortem asymmetrical ventricular septal hypertrophy is noted. Analysis of the cardiac tissue is most likely to demonstrate a defect in which one of the following?

- ☐ Tropomyosin
- ☐ Myosin light-chain kinase
- ☐ Calmodulin
- ☐ Troponin C
- ☐ Beta-myosin heavy chain protein

A 19-year-old man collapses and dies whilst playing rugby at university. At post-mortem asymmetrical ventricular septal hypertrophy is noted. Analysis of the cardiac tissue is most likely to demonstrate a defect in which one of the following?



A 67-year-old man with a history of hypertension presents to the emergency department with a 24hr history of dyspnoea and palpitations. He also complains of mild chest discomfort. On examination, you note an irregularly irregular pulse of 115 beats per minute, blood pressure 95 / 70 mmHg and a respiratory rate of 20 breaths/min. He denies any regular medication and insists he has never experienced anything like this before. An ECG shows absent P waves with QRS complexes irregularly irregular intervals.

What is the most appropriate management?

- ☐ Clopidogrel
- ☐ Direct current cardioversion
- ☐ Bisoprolol
- ☐ IV adenosine
- ☐ Digoxin

Clopidogrel

3%

Direct current cardioversion

69%

Bisoprolol

16%

IV adenosine

6%

Digoxin

7%

New onset AF is considered for electrical cardioversion if it presents within 48 hours of presentation

Important for me Less important

This is an individual presenting a clinical picture of new-onset atrial fibrillation. A blood pressure of 95/70 mmHg in a patient with a history of high blood pressure, who is currently not taking any blood pressure medication is quite concerning. It suggests that he is hemodynamically unstable. The most appropriate treatment for new-onset atrial fibrillation (AF) within 48hrs is DC cardioversion if unstable or either DC cardioversion or pharmacological cardioversion. Beta-blockers can be used for rate control. Clopidogrel is not a treatment of AF. Bisoprolol would be a suitable alternative if the patient was more stable. Digoxin is ideal for patients with AF and heart failure. IV adenosine is a treatment for narrow complex supraventricular tachyarrhythmias

A 17-year-old male is taken to the Emergency Department due to alcohol intoxication. On examination he is noted to be tachycardic with a rate of 140bpm. An ECG shows atrial fibrillation. The following morning he is noted to be in sinus rhythm. What is the most appropriate management?

- ☐ Sotalol and aspirin
- ☐ Sotalol and warfarin
- ☐ Refer for accessory pathway ablation
- ☐ Amiodarone and aspirin
- ☐ Discharge

A 17-year-old male is taken to the Emergency Department due to alcohol intoxication. On examination he is noted to be tachycardic with a rate of 140bpm. An ECG shows atrial fibrillation. The following morning he is noted to be in sinus rhythm. What is the most appropriate management?

Sotalol and aspirin	5%
Sotalol and warfarin	6%
Refer for accessory pathway ablation	10%
Amiodarone and aspirin	6%
Discharge	74%

Supraventricular arrhythmias secondary to acute alcohol intake are well characterised and have been termed 'holiday heart syndrome'. No specific treatment is required

You review a 51-year-old hypertensive patient who you started on 2.5mg of ramipril one month ago. He is complaining of a tickly cough since starting the medication which is keeping him awake at night. However, his blood pressure is now within normal limits.

What should you advise him?

- ☐ The cough is unlikely to be caused by the ramipril, continue the medication and review in a month
- ☐ The cough should settle within the next month, continue the medication and review in a month
- ☐ Stop the ramipril and prescribe a different ACE-inhibitor
- ☐ Stop the ramipril and prescribe 5mg amlodipine
- ☐ Stop the ramipril and prescribe candesartan

The cough is unlikely to be caused by the ramipril, continue the medication and review in a month

3%

The cough should settle within the next month, continue the medication and review in a month

9%

Stop the ramipril and prescribe a different ACE-inhibitor

6%

Stop the ramipril and prescribe 5mg amlodipine

17%

Stop the ramipril and prescribe candesartan

66%

For a patient under 55 who is intolerant to an ACE-i the next step would be to offer an angiotensin 2 receptor blocker (ARB)

Important for me Less important

ACE inhibitors are commonly associated with a dry, persistent cough. A cough is unlikely to settle without stopping the ACE-inhibitor and prescribing a different class of drug. For a patient under 55 who is intolerant to an ACE-inhibitor the next step would be to offer an angiotensin 2 receptor blocker (ARB), eg candesartan.

What is the usual target INR for a patient with a mechanical mitral valve?

☐ 2.0

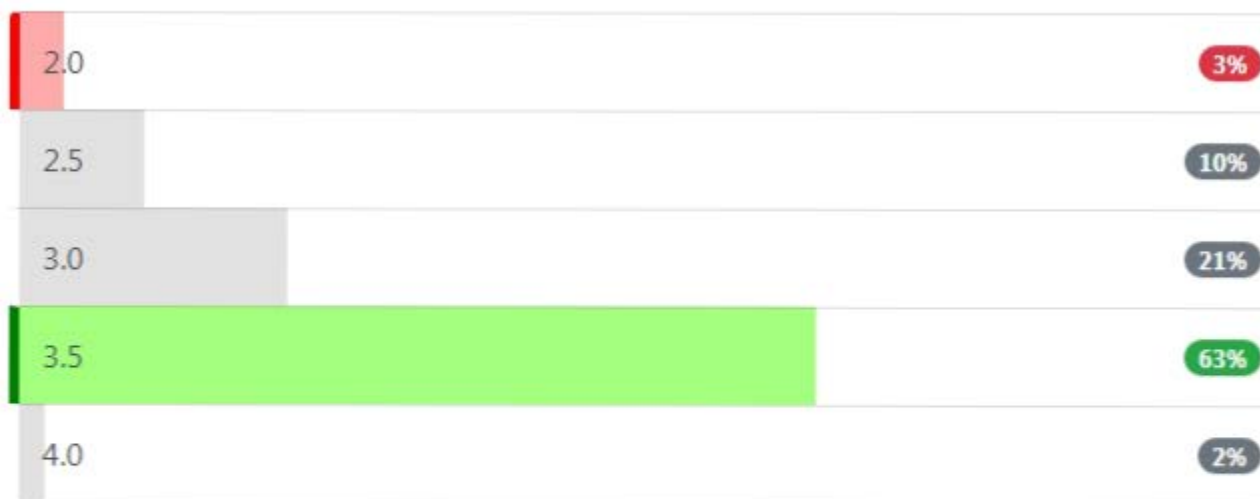
☐ 2.5

☐ 3.0

☐ 3.5

☐ 4.0

What is the usual target INR for a patient with a mechanical mitral valve?



Mechanical valves - target INR:

- aortic: 3.0
- mitral: 3.5

Important for me Less important

Which part of the jugular venous waveform is associated with the opening of the tricuspid valve?

☐ x descent

☐ v wave

☐ a wave

☐ c wave

☐ y descent

x descent

17%

v wave

14%

a wave

10%

c wave

11%

y descent

49%

JVP: y descent = opening of tricuspid valve

Important for me Less important

A patient who is intolerant of aspirin is started on clopidogrel for the secondary prevention of ischaemic heart disease. Concurrent use of which one of the following drugs may make clopidogrel less effective?

- ☐ Warfarin
- ☐ Omeprazole
- ☐ Codeine
- ☐ Long-term tetracycline use (e.g. For acne rosacea)
- ☐ Selective serotonin reuptake inhibitors

Warfarin

6%

Omeprazole

65%

Codeine

3%

Long-term tetracycline use (e.g. For acne rosacea)

14%

Selective serotonin reuptake inhibitors

12%

Each one of the following physiological changes occur during exercise, except:

- ☐ Increased myocardial contractibility
- ☐ 50% increase in stroke volume
- ☐ Up to 3-fold increase in heart rate
- ☐ Rise in diastolic blood pressure
- ☐ Venous constriction

Each one of the following physiological changes occur during exercise, except:

Increased myocardial contractibility

4%

50% increase in stroke volume

8%

Up to 3-fold increase in heart rate

9%

Rise in diastolic blood pressure

45%

Venous constriction

35%

Dr. Assem

A 59-year-old patient was found to have a moderate hypercalcaemia in a routine blood sample order by his general practitioner. He is only taking a non-prescribed prophylactic dose of vitamin D for the last six months, which he had bought over the counter. On examination he is bright and alert, well perfused with moist mucous membranes. There is no neurological symptoms and electrocardiogram shows a normal sinus rhythm. Hypercalcaemia is a relatively frequent clinical problem and although clinical signs and symptoms of all hypercalcaemia tend to be similar, there are several clinical features that may help to distinguish them according to aetiology. Which of the following medical conditions is less likely to produce hypercalcemia?

- ☐ Multiple myeloma
- ☐ Primary hyperparathyroidism
- ☐ Sarcoidosis
- ☐ Hodgkin's lymphoma
- ☐ Familial hypomagnesemia with hypercalciuria and nephrocalcinosis

A 59-year-old patient was found to have a moderate hypercalcaemia in a routine blood sample order by his general practitioner. He is only taking a non-prescribed prophylactic dose of vitamin D for the last six months, which he had bought over the counter. On examination he is bright and alert, well perfused with moist mucous membranes. There is no neurological symptoms and electrocardiogram shows a normal sinus rhythm. Hypercalcaemia is a relatively frequent clinical problem and although clinical signs and symptoms of all hypercalcaemia tend to be similar, there are several clinical features that may help to distinguish them according to aetiology. Which of the following medical conditions is less likely to produce hypercalcemia?

Multiple myeloma

4%

Primary hyperparathyroidism

6%

Sarcoidosis

5%

Hodgkin's lymphoma

25%

Familial hypomagnesemia with hypercalciuria and nephrocalcinosis

60%

A 57-year-old patient with acute pulmonary oedema is admitted to the ITU department. She has no past medical history of note. A Swan-Ganz catheter is inserted to enable measurement of the pulmonary capillary wedge pressure. Which chamber of the heart does this pressure generally equate to?

- ☐ The difference between the left atrium and right ventricle
- ☐ Left ventricle
- ☐ Left atrium
- ☐ Right ventricle
- ☐ Right atrium

The difference between the left atrium and right ventricle

7%

Left ventricle

6%

Left atrium

41%

Right ventricle

16%

Right atrium

30%

A 51-year-old man presents four weeks after being discharged from hospital. He had been admitted with chest pain and thrombolysed for a myocardial infarction. This morning he developed marked tongue and facial swelling. Which one of the following drugs is most likely to be responsible?

- ☐ Atorvastatin
- ☐ Isosorbide mononitrate
- ☐ Atenolol
- ☐ Aspirin
- ☐ Ramipril



ACE inhibitors are the most common cause of drug-induced angioedema.

Which one of the following is least associated with Wolff-Parkinson White syndrome?

- ☐ Mitral valve prolapse
- ☐ Ebstein's anomaly
- ☐ Thyrotoxicosis
- ☐ Coarctation of the aorta
- ☐ Hypertrophic cardiomyopathy

Mitral valve prolapse

14%

Ebstein's anomaly

13%

Thyrotoxicosis

19%

Coarctation of the aorta

40%

Hypertrophic cardiomyopathy

14%

A 71-year-old man who had a bioprosthetic aortic valve replacement three years ago is reviewed. What antithrombotic therapy is he likely to be taking?

- ☐ Nothing
- ☐ Aspirin
- ☐ Warfarin: INR 2.0-3.0
- ☐ Aspirin + clopidogrel
- ☐ Warfarin: INR 3.0-4.0

Nothing

27%

Aspirin

37%

Warfarin: INR 2.0-3.0

21%

Aspirin + clopidogrel

3%

Warfarin: INR 3.0-4.0

11%

Prosthetic heart valves - antithrombotic therapy:

- bioprosthetic: aspirin
- mechanical: warfarin + aspirin

Important for me Less important

Dr. Assem

Which one of the following treatments is not appropriate in the management of Wolff-Parkinson White?

- ☐ Verapamil
- ☐ Sotalol
- ☐ Amiodarone
- ☐ Flecainide
- ☐ Radiofrequency ablation of the accessory pathway

Treatment	Percentage
Verapamil	68%
Sotalol	14%
Amiodarone	6%
Flecainide	8%
Radiofrequency ablation of the accessory pathway	3%

68%

Sotalol

14%

Amiodarone

6%

Flecainide

8%

Radiofrequency ablation of the accessory pathway

3%

Verapamil and digoxin should be avoided in patients with Wolff-Parkinson White as they may precipitate VT or VF

A 76-year-old man is reviewed. He was recently admitted after being found to be in atrial fibrillation. This was his second episode of atrial fibrillation. He also takes ramipril for hypertension but has no other history of note. During admission he was warfarinised and discharged with planned follow-up in the cardiology clinic. However, on review today he is found to be in sinus rhythm. What should happen regarding anticoagulation?

- ☐ Stop warfarin
- ☐ Continue warfarin for 1 month
- ☐ Stop warfarin + start aspirin
- ☐ Continue lifelong warfarin
- ☐ Continue warfarin for 6 months



Warfarin should be continued indefinitely as this is his second episode of atrial fibrillation and he has risk factors for stroke (age, hypertension)

A 47-year-old man is admitted to hospital following an acute coronary syndrome. He has a history peptic ulcer disease and his cardiologist decides to use clopidogrel. What is the mechanism of action of clopidogrel?

- ☐ Non-selective phosphodiesterase inhibitor
- ☐ Phosphodiesterase V inhibitor
- ☐ Inhibits ATP binding to its platelet receptor
- ☐ Inhibits ADP binding to its platelet receptor
- ☐ Glycoprotein IIb/IIIa inhibitor

A 47-year-old man is admitted to hospital following an acute coronary syndrome. He has a history peptic ulcer disease and his cardiologist decides to use clopidogrel. What is the mechanism of action of clopidogrel?

Non-selective phosphodiesterase inhibitor

2%

Phosphodiesterase V inhibitor

3%

Inhibits ATP binding to its platelet receptor

3%

Inhibits ADP binding to its platelet receptor

87%

Glycoprotein IIb/IIIa inhibitor

4%

Clopidogrel inhibits ADP binding to platelet receptors

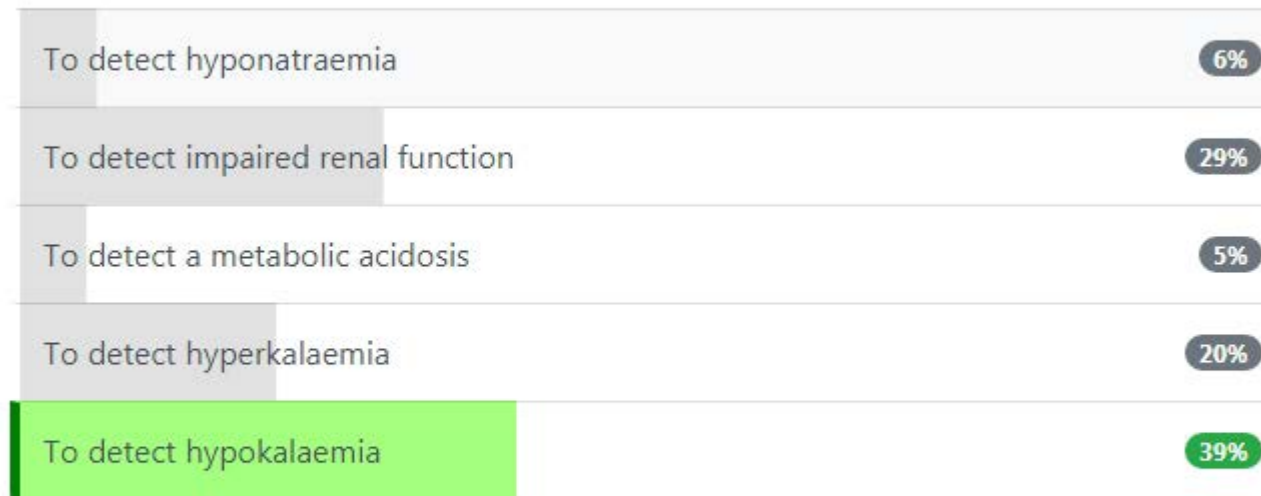
Important for me Less important

Dr Assem

What is the main reason for checking the urea and electrolytes prior to commencing a patient on amiodarone?

- ☐ To detect hyponatraemia
- ☐ To detect impaired renal function
- ☐ To detect a metabolic acidosis
- ☐ To detect hyperkalaemia
- ☐ To detect hypokalaemia

What is the main reason for checking the urea and electrolytes prior to commencing a patient on amiodarone?



All antiarrhythmic drugs have the potential to cause arrhythmias. Coexistent hypokalaemia significantly increases this risk.

A 44-year-old gentleman presents to the emergency department with chest pain. As the acting cardiology registrar, you are asked to see him immediately as he ECG shows ST segment elevation in multiple leads. When you arrive, he is sitting in bed leaning forward to rest his arms on his knees.

His past medical history includes hypertension, type 1 diabetes mellitus (diagnosed aged 11) and his father died from a myocardial infarction age 60. In addition to this, he tells you he has been well recently apart from a slight 'sore throat' 2 weeks ago that cleared up with no problems. He first noticed the chest pain 4 hours ago while still in bed this morning and he describes it as left sided chest pain with no radiation. He has taken 1g paracetamol with minimal improvement.

Given the likely diagnosis, which of the following is the most specific ECG finding in this condition?

- ☐ Reciprocal ST depression
- ☐ Shortened PR interval
- ☐ 'Tombstoning' ST elevation in all precordial leads
- ☐ Peaked T waves
- ☐ PR depression

Reciprocal ST depression	6%
Shortened PR interval	7%
'Tombstoning' ST elevation in all precordial leads	27%
Peaked T waves	3%
PR depression	56%

The most likely diagnosis in the case is acute pericarditis. Though he does have some risk factors for ischaemic heart disease, there are points in the history which lead you towards a diagnosis of pericarditis: the history of viral illness, widespread ST elevation and posture of the patient (sitting forward suggesting this is comfortable/gives some pain relief) are typical.

All of the above ECG features may be seen in pericarditis. However, the only specific finding is PR depression and therefore this is the most appropriate answer. In addition to this, ST elevation in pericarditis would classically be described as 'saddle-shaped.'

A 72-year-old man is started on amlodipine 5mg od for hypertension. He has no other past medical history of note and routine bloods (including fasting glucose) and ECG were normal.

What should his target blood pressure be once on treatment?

☐ < 130/80 mmHg

☐ < 140/80 mmHg

☐ < 140/85 mmHg

☐ < 140/90 mmHg

☐ < 150/90 mmHg

< 130/80 mmHg

16%

< 140/80 mmHg

18%

< 140/85 mmHg

12%

< 140/90 mmHg

47%

< 150/90 mmHg

7%

Blood pressure target (< 80 years, clinic reading) - 140/90 mmHg

Important for me

Less important

A 76-year-old gentleman is admitted through the Emergency Department with worsening shortness of breath and ankle swelling on a background of left ventricular failure secondary to ischaemic heart disease. He has bibasal crepitations on auscultation and a raised JVP of 4 cm with peripheral pitting oedema to his knees. He is commenced on IV furosemide.

What is the mechanism of action of furosemide?

- ☐ Inhibition of the Na^+/Cl^- transporter in the distal convoluted tubule
- ☐ Aldosterone antagonist
- ☐ Inhibition of the $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ co-transporter in the thick ascending limb of the loop of Henle
- ☐ Inhibition of the $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ co-transporter in the proximal tubule
- ☐ Inhibition of sodium channels in the collecting tubules

Inhibition of the Na^+Cl^- transporter in the distal convoluted tubule

7%

Aldosterone antagonist

2%

Inhibition of the $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ co-transporter in the thick ascending limb of the loop of Henle

79%

Inhibition of the $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ co-transporter in the proximal tubule

6%

Inhibition of sodium channels in the collecting tubules

5%

Furosemide - inhibits the Na-K-Cl cotransporter in the thick ascending limb of the loop of Henle

Important for me Less important

Loop diuretics (furosemide, bumetanide) act by inhibiting the $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ cotransporter in the thick ascending limb of the loop of Henle. This causes loss of water along with sodium chloride, potassium, calcium, and hydrogen ions.

Explanation for other options:

- 1. Describes mechanism of thiazide diuretics
- 2. Spironolactone and eplerenone are examples of aldosterone antagonists
- 4. This answer is incorrect
- 5. Describes mechanism of amiloride and triamterene

Dr Assem

Which one of the following diuretics works by inhibiting a transmembrane cotransporter protein?

☐ Indapamide

☐ Eplerenone

☐ Furosemide

☐ Amiloride

☐ Mannitol

Indapamide

20%

Eplerenone

13%

Furosemide

42%

Amiloride

15%

Mannitol

11%

Furosemide - inhibits the Na-K-Cl cotransporter in the thick ascending limb of the loop of Henle

Important for me Less important

A 62-year-old man is reviewed. His blood pressure is poorly controlled at 152/90 mmHg despite treatment with ramipril 10mg od, bendroflumethiazide 2.5mg od and amlodipine 10mg od. In addition to the antihypertensives he also takes aspirin and simvastatin. His most recent blood tests show the following:

Na ⁺	139 mmol/l
K ⁺	4.2 mmol/l
Urea	5.5 mmol/l
Creatinine	98 µmol/l

What is the most appropriate change to his medication?

- ☐ Add frusemide
- ☐ Increase ramipril to 20mg od
- ☐ Add spironolactone
- ☐ Add candesartan
- ☐ Add atenolol

Add frusemide	6%
Increase ramipril to 20mg od	12%
Add spironolactone	67%
Add candesartan	3%
Add atenolol	12%

Poorly controlled hypertension, already taking an ACE inhibitor, calcium channel blocker and a thiazide diuretic. $K^+ < 4.5\text{mmol/l}$ - add spironolactone

Important for me Less important

This patient has reached step 4 in the NICE hypertension guidelines. As their potassium is less than 4.5 mmol/l spironolactone 25mg od should be started.

Which of the following statements concerning the third heart sound is correct?

- ☐ Caused by systolic filling of the ventricle
- ☐ May be heard in constrictive pericarditis
- ☒ Associated with atrial septal defects
- ☐ Is characteristically soft in aortic stenosis
- ☐ Caused by atrial contraction against a stiff ventricle

Which of the following statements concerning the third heart sound is correct?

Caused by systolic filling of the ventricle

26%

May be heard in constrictive pericarditis

35%

Associated with atrial septal defects

7%

Is characteristically soft in aortic stenosis

6%

Caused by atrial contraction against a stiff ventricle

26%

Third heart sound - constrictive pericarditis

Important for me Less important

A third heart sound is often heard in left ventricular failure and constrictive pericarditis

A 68-year-old gentleman is brought into resus in your local emergency department after a syncopal episode. He is alert but clearly distressed.

The monitor above the bed showed a heart rate of 190bpm with a blood pressure of 85/50mmHg. His oxygen saturations are 98% in high flow oxygen (15L per minute via non-rebreathe mask). You are awaiting a full 12 lead ECG to be performed but the trace on cardiac monitor appears to show a regular broad complex tachycardia. A formal ECG subsequently confirms that the arrhythmia is a ventricular tachycardia (VT) with a QRS complex duration of 150ms.

With regard to the JVP waveform, which of these features would you expect to see?

- ☐ Giant v waves
- ☐ Cannon a waves
- ☐ Prominent x descent
- ☐ Slow y descent
- ☐ Large a waves

Giant v waves	10%
Cannon a waves	66%
Prominent x descent	7%
Slow y descent	6%
Large a waves	11%

The correct answer is B: cannon a waves.

Cannon a waves result from atrial contraction against a closed tricuspid valve and therefore can be seen in VT when atrial and ventricular contraction is not co-ordinated. They can also be seen in complete/3rd degree heart block and atrial flutter for the same reason.

Giant V waves are a features of tricuspid regurgitation; prominent x descent is a feature of constrictive pericarditis; slow y descent is a feature of cardiac tamponade and tricuspid stenosis; and large a waves can be found in tricuspid stenosis, right heart failure and pulmonary hypertension.

A 53-year-old man presents as he is worried about palpitations. These are described as fast and irregular and typically occur twice a day. They seem to be more common after drinking alcohol. There is no history of chest pain or syncope. Examination of his cardiovascular symptoms is normal with a pulse of 72/min and a blood pressure of 116/78 mmHg. Blood tests and a 12-lead ECG are unremarkable. What is the most appropriate next step in management?

- ☐ Reassure and repeat 12-lead ECG in 3 months time
- ☐ Request a troponin I
- ☐ Arrange an echocardiogram
- ☐ Arrange a Holter monitor
- ☐ Arrange an external loop recorder

Reassure and repeat 12-lead ECG in 3 months time	16%
Request a troponin I	2%
Arrange an echocardiogram	5%
Arrange a Holter monitor	69%
Arrange an external loop recorder	8%

Palpitations should first be investigated with a Holter monitor after initial bloods/ECG

Important for me ~~Less important~~

These episodes are characteristic of an arrhythmia, possibly atrial fibrillation. First-line investigations are normal and it is appropriate to investigate further to exclude an arrhythmia.

Holter monitoring should be arranged to try and capture such an episode. Given the episodes occur daily it is reasonable to do this over a 24 hour period initially.

A troponin is not indicated given the absence of chest pain and there is no suggestion of heart failure to warrant an echocardiogram.

An external loop recorder should only be considered if the Holter monitoring is normal and the patient continues to have symptoms.

A 73 year-old male has progressive exertional dyspnoea due to progressive systolic heart failure with a left ventricular ejection fraction of 30%. What investigation is most useful in predicting symptomatic response to cardiac resynchronisation therapy?

- ☐ Cardiac MRI
- ☐ Transoesophageal Echo
- ☐ Coronary angiogram
- ☐ ECG
- ☐ Nuclear perfusion scan



The key diagnostic tests used to identify patients likely to benefit from cardiac resynchronization therapy is the transthoracic echocardiogram and ECG. Those with left ventricular ejection fractions of $<35\%$ and a LBBB (QRS duration greater than 120 ms) on ECG are excellent candidates for CRT (biventricular pacing). The echo will show asynchronous contraction of the LV and RV and subsequently reduced ejection fraction. A transoesophageal echo is not required.

Biventricular pacing improves quality of life and exercise tolerance amongst other endpoints, and does so by ensuring that the ventricles contract at the same time (resynchronization) due to asynchronous stimulation (LBBB causing asynchronous activation) via the conduction system.

A 24-year-old female who is 10 weeks in to her first pregnancy presents for review. Her blood pressure today is 126/82 mmHg. What normally happens to blood pressure during pregnancy?

- ☐ Falls in first half of pregnancy before rising to pre-pregnancy levels before term
- ☐ Systolic + diastolic rises by < 10 mmHg
- ☐ Systolic + diastolic falls by < 10 mmHg
- ☐ Rise in first half of pregnancy before falling to pre-pregnancy levels before term
- ☐ Doesn't change

Falls in first half of pregnancy before rising to pre-pregnancy levels before term 68%

Systolic + diastolic rises by < 10 mmHg 7%

Systolic + diastolic falls by < 10 mmHg 6%

Rise in first half of pregnancy before falling to pre-pregnancy levels before term 15%

Doesn't change 4%

A 35-year-old woman who presents with progressive dyspnoea is diagnosed as having primary pulmonary hypertension. She is started on an endothelin receptor antagonist. What is the aim of this treatment?

- ☐ Increase blood flow to the lungs
- ☐ Reduce the risk of secondary pulmonary fibrosis
- ☐ Reduce pulmonary vascular resistance leading to reduced right ventricle (RV) systolic pressure
- ☐ Decrease the pulmonary venous pressure
- ☐ Increase the oxygen saturation of venous blood flowing to the left atrium

Increase blood flow to the lungs

4%

Reduce the risk of secondary pulmonary fibrosis

3%

Reduce pulmonary vascular resistance leading to reduced right ventricle (RV) systolic pressure

79%

Decrease the pulmonary venous pressure

11%

Increase the oxygen saturation of venous blood flowing to the left atrium

3%

Endothelin receptor antagonists decrease pulmonary vascular resistance in patients with primary pulmonary hypertension

Important for me Less important

The aim of endothelin receptor antagonist therapy is to reduce pulmonary vascular resistance and hence reduce the strain on the right ventricle. Right ventricular failure is the most common cause of death in patients with primary pulmonary hypertension.

A 70-year-old man with a background of ischaemic heart disease and peripheral arterial disease presents to the Emergency Department. He has been feeling generally unwell for the past two days with fever and myalgia but this morning developed a purple, cold left middle toe. On examination there are signs of early ischaemia to the toe and a faint livedo reticularis rash is seen on the foot. A diagnosis of cholesterol embolisation is suspected. Which of the following features would be most supportive of this diagnosis?

- ☐ Lymphocytosis
- ☐ Thrombocytosis
- ☐ Neutrophilia
- ☐ Thrombocytopenia
- ☐ Eosinophilia



Eosinophilia is seen in around 70% of cases of cholesterol embolisation.

Your next patient is a 74-year-old woman who is known to have type 2 diabetes mellitus. Her blood pressure has been borderline for a number of weeks now but you have decided she would benefit from treatment. Her latest blood pressure is 146/88 mmHg, HbA1c is 7.5% and her BMI is 25 kg/m². What is the most appropriate drug to prescribe?

- ☐ Bisoprolol
- ☐ Bendroflumethiazide
- ☐ Amlodipine
- ☐ Ramipril
- ☐ Orlistat

Bisoprolol

4%

Bendroflumethiazide

2%

Amlodipine

33%

Ramipril

57%

Orlistat

4%

Hypertension in diabetics - ACE-inhibitors are first-line regardless of age

Important for me Less important

Dr Assem

A 45-year-old man presents with pleuritic central chest pain and flu-like symptoms to the Emergency Department. The pain started yesterday and is worse at night when he lies flat. Which one of the following ECG findings is most specific for the likely diagnosis?

- ☐ PR depression
- ☐ T wave inversion
- ☐ Short PR interval
- ☐ U waves
- ☐ ST elevation

PR depression

63%

T wave inversion

4%

Short PR interval

7%

U waves

2%

ST elevation

24%

ST elevation is seen but is not specific as it may also indicate ischaemia

A 17-year-old female presents with recurrent attacks of collapse. These episodes typically occur without warning and have occurred whilst she was running for a bus. There is no significant past medical history and the only family history of note is that her father died suddenly when he was 38-years-old. What is the likely cause?

☐ Vaso-vagal attacks

☐ Anxiety

☐ Epilepsy

☐ Cardiogenic syncope

☐ Malingering

Vaso-vagal attacks

7%

Anxiety

2%

Epilepsy

2%

Cardiogenic syncope

86%

Malingering

2%

Sudden death, unusual collapse in young person - ? HOCM

Important for me Less important

This is a rather vague question. However, a family history of sudden death should make you think of conditions such as hypertrophic obstructive cardiomyopathy

A 55-year-old man is admitted to the Emergency Department with 'tearing' chest pain radiating through to his back. Examination reveals a pulse of 96 / min regular, blood pressure of 130/85 mmHg and oxygen saturations of 97% on room air. A chest x-ray shows mediastinal widening. A CT shows dissection of the ascending aorta. What is the most suitable initial management?

☐ IV sodium nitroprusside

☐ Oral verapamil

☐ Observe only

☐ IV labetalol

☐ Surgical repair

IV sodium nitroprusside

7%

Oral verapamil

2%

Observe only

5%

IV labetalol

48%

Surgical repair

37%

Aortic dissection

- type A - ascending aorta - control BP(IV labetalol) + surgery
- type B - descending aorta - control BP(IV labetalol)

Important for me Less important

The question tests ability to apply textbook knowledge to real world situations. Whilst surgical referral should be made as soon as possible definite surgery will inevitably take time and the blood pressure should be controlled in the meantime

Which one of the following clinical signs would best indicate severe aortic stenosis?

- ☐ Valvular gradient of less than 30 mmHg
- ☐ Soft second heart sound
- ☐ Quiet first heart sound
- ☐ Development of an opening snap
- ☐ Carotid radiation of ejection systolic murmur

Which one of the following clinical signs would best indicate severe aortic stenosis?

Valvular gradient of less than 30 mmHg

11%

Soft second heart sound

57%

Quiet first heart sound

8%

Development of an opening snap

10%

Carotid radiation of ejection systolic murmur

14%

Questions may sometimes refer to a soft A2 rather than a soft S2 (second heart sound), specifically mentioning the aortic component.

A 70-year-old retired office worker is admitted to the medical unit with a 2 day history of shortness of breath and chest pain on inspiration. He has had a normal chest x-ray and ECG. Full blood count, C-reactive protein, urea and electrolytes are unremarkable. Observations are within normal levels. Which scoring system should be used to determine which investigation to perform next?

☐ CHA2DS2-VASC score

☐ Two level Wells score

☐ CURB-65 score

☐ Rockall score

☐ PERC score

Two level Wells score	70%
CURB-65 score	9%
Rockall score	6%
PERC score	9%

The two level Well's score can be used in patients presenting with signs and symptoms suggestive of PE to guide the next investigation

Important for me Less important

This patient has symptoms suggestive of PE but normal investigations and normal observations. The two-level Wells score for PE is designed to aid decision making in choosing investigations. The full Wells score can be found in the background notes. Patients in the 'PE likely' group with > 4 points should have an urgent CTPA. Patients in the 'PE unlikely' group should have a d-dimer. If the d-dimer is positive they should go on to have a CTPA. If the d-dimer is negative an alternative diagnosis should be considered for their symptoms.

1. CHA2DS2-VASC score - a scoring system for risk of stroke in AF
3. CURB-65 score - a scoring system for prognosis in community acquired pneumonia
4. Rockall score - scoring system for upper GI bleeds

A 54-year-old man with a history of ischaemic heart disease is currently taking atorvastatin 40mg at night. A repeat lipid profile is ordered:

Total cholesterol	3.9 mmol/l
HDL	0.7 mmol/l
LDL	2.6 mmol/l
Triglycerides	1.2 mmol/l

What would be the most effective way of increasing HDL levels?

- ☐ Add nicotinic acid
- ☐ Add ezetimibe
- ☐ Switch atorvastatin to pravastatin
- ☐ Add bezafibrate
- ☐ Add colestyramine

Add nicotinic acid

44%

Add ezetimibe

19%

Switch atorvastatin to pravastatin

9%

Add bezafibrate

21%

Add colestyramine

6%

Nicotinic acid increases HDL levels

Important for me Less important

Dr. Assem

Which one of the following statements regarding percutaneous coronary intervention (PCI) is **incorrect**?

- ☐ Stent thrombosis usually occurs in the first month
- ☐ Restenosis is more common than stent thrombosis
- ☐ Around 95% of patients have a stent fitted during a PCI
- ☐ Renal impairment is a risk factor for restenosis
- ☐ Patients with drug-eluting stents require a shorter duration of clopidogrel therapy

Stent thrombosis usually occurs in the first month

11%

Restenosis is more common than stent thrombosis

16%

Around 95% of patients have a stent fitted during a PCI

15%

Renal impairment is a risk factor for restenosis

10%

Patients with drug-eluting stents require a shorter duration of clopidogrel therapy

48%

PCI - patients with drug-eluting stents require a longer duration of clopidogrel therapy

Important for me Less important

Dr Assem

A 79-year-old female presents to the low-risk chest pain clinic with intermittent substernal chest pains. The pain typically comes on with exertion and improves with rest. A trial of GTN has been given by her GP which helps with her pain. She is a known ex-smoker of 30 pack-years. She has no diabetes, hyperlipidaemia, hypertension, and no family history of coronary artery disease.

On examination her observations are stable. On auscultations of her chest, her first and second heart sounds are audible with no added sounds and her lungs are clear.

A pre-test probability is calculated for coronary artery disease which gives a result of 45%.

What is the most important investigation to pursue given her risk for coronary artery disease?

- ☐ CT calcium scoring
- ☐ Coronary angiogram
- ☐ Stress test ECG
- ☐ Myocardial perfusion scintigraphy
- ☐ No further investigations

CT calcium scoring	25%
Coronary angiogram	29%
Stress test ECG	15%
Myocardial perfusion scintigraphy	24%
No further investigations	6%

The answer is myocardial perfusion scintigraphy which is appropriate for a pre-test coronary artery disease probability of between 30-60%. If the pre-test probability is above this, then invasive coronary angiography is appropriate, below this CT calcium scoring. Given this chest pain is typical for coronary artery disease, the no further investigations answer would be inappropriate.

The 2010 NICE guidance for patients presenting with chest pain recommends that neither exercise ECG nor MR coronary angiography should be used to diagnose or exclude stable angina for people without known CAD (Reference: *Chest pain of recent onset; NICE Clinical Guideline (March 2010, updated Nov 2016)*).

A 61-year-old man is admitted with central crushing chest pain to the Emergency Department. An ECG taken immediately on arrival shows ST-elevation in leads II, III and aVF. His only past medical history of note is hypertension for which he takes ramipril, aspirin and simvastatin. What is the optimum management of this patient?

(LMWH = low-molecular weight heparin)

- ☐ Aspirin + clopidogrel + LMWH + repeat ECG in 20 minutes
- ☐ Clopidogrel + LMWH + alteplase
- ☐ Aspirin + clopidogrel + LMWH + tenecteplase
- ☐ Aspirin + clopidogrel + LMWH + alteplase
- ☐ Aspirin + clopidogrel + IV heparin + immediate percutaneous coronary intervention

Aspirin + clopidogrel + LMWH + repeat ECG in 20 minutes

5%

Clopidogrel + LMWH + alteplase

3%

Aspirin + clopidogrel + LMWH + tenecteplase

3%

Aspirin + clopidogrel + LMWH + alteplase

6%

Aspirin + clopidogrel + IV heparin + immediate percutaneous coronary intervention

82%

Primary percutaneous coronary intervention is the gold-standard treatment for ST-elevation myocardial infarction

Important for me Less important

Dr Assem

A 48-year-old gentleman presents with a 3-day history of palpitations. This is on a background of recurrent atrial fibrillation with previous failed cardioversion attempts but had successful electrical cardioversion 8 months previously. An ECG confirms that he is in atrial fibrillation with a rate of 80 beats per minute. He currently takes bisoprolol and apixaban. The cardiology consultant reviews and has planned electrical cardioversion for 4 weeks time.

Until he is cardioverted, which of the following should be given in addition to his current medications?

- ☐ Digoxin
- ☐ Amiodarone
- ☐ Flecainide
- ☐ Procainamide
- ☐ Verapamil

Amiodarone	53%
Flecainide	23%
Procainamide	3%
Verapamil	8%

If high-risk of failure of cardioversion (previous failure), offer electrical cardioversion after at least 4 weeks treatment with amiodarone

Important for me Less important

NICE recommend giving amiodarone or sotalol for at least 4 weeks prior to electrical cardioversion in cases where there is a high risk of failure (recurrent AF or previous failed cardioversion attempts).

Digoxin and verapamil can be used for rate control in AF, but the rate is already well controlled with bisoprolol.

Flecainide can be used for pharmacological cardioversion of AF in patients without structural heart disease, but the question states that electrical cardioversion is planned so there is no role for that here.

Procainamide has a role in ventricular tachycardia but is not indicated here.

A 48-year-old Asian lady was seen by her general practitioner (GP) with a 3-week history of fever, fatigue and night sweats. On examination, she was found to have absent limb pulses with blood tests revealing;

Hb	101 g/l
ESR	87 mm/hr

Her symptoms improved following a course of steroids. Which blood vessel is most likely to be affected by her condition?

- ☐ Arteries of the hands and feet
- ☐ Inferior vena cava (IVC)
- ☐ Superior vena cava (SVC)
- ☐ Renal arteries
- ☐ Aorta



Takayasu's arteritis is an obliterative arteritis affecting the aorta

Important for me Less important

Takayasu's arteritis is a large vessel vasculitis typically affecting the aorta and leads to absent limb pulses.

Arteries of the hands and feet - characteristic of Buerger disease

IVC and SVC - involved in venous return and do not belong to the arterial system

Renal arteries - a medium-sized vessel

You review a 34-year-old woman who is 13 weeks pregnant. During her previous pregnancy she developed pre-eclampsia and had to have a caesarean section at 36 weeks gestation. Her blood pressure both following the last pregnancy and today is normal. Which one of the following interventions should be offered to reduce the risk of developing pre-eclampsia again?

- ☐ Prophylactic nifedipine therapy
- ☐ Prophylactic labetalol therapy
- ☐ Vitamin B6 supplementation
- ☐ Extended folic acid supplementation
- ☐ Low-dose aspirin

You review a 34-year-old woman who is 13 weeks pregnant. During her previous pregnancy she developed pre-eclampsia and had to have a caesarean section at 36 weeks gestation. Her blood pressure both following the last pregnancy and today is normal. Which one of the following interventions should be offered to reduce the risk of developing pre-eclampsia again?

Prophylactic nifedipine therapy	6%
Prophylactic labetalol therapy	9%
Vitamin B6 supplementation	4%
Extended folic acid supplementation	6%
Low-dose aspirin	74%

Dr Assem

A 45-year-old man is diagnosed with endocarditis of the aortic valve. He is treated with intravenous benzylpenicillin and gentamicin. What is the most important ECG change to monitor for?

- ☐ Left ventricular hypertrophy (by voltage criteria)
- ☐ Reflex tachycardia
- ☐ ST segment depression
- ☐ Prolonged QT interval
- ☐ Prolonged PR interval

Left ventricular hypertrophy (by voltage criteria)

6%

Reflex tachycardia

3%

ST segment depression

5%

Prolonged QT interval

21%

Prolonged PR interval

64%

A prolonged PR interval - aortic root abscess

Important for me Less important

A prolonged PR interval could indicate the development of an aortic abscess, an indication for surgery

Dr Assem

You are on the cardiac arrest team and are called to the emergency department for a 25-year-old male who has arrived in cardiac arrest. He collapsed while playing football. His brother is present: he reports that their father died suddenly in his 30s and they were later told he had hypertrophic obstructive cardiomyopathy (HOCM). Screening had been discussed with both his children but this had not happened yet.

Assuming the diagnosis is the same, which of the following is likely to confer the poorest prognosis?

- ☐ Genetic mutation in troponin T
- ☐ Left ventricular wall thickness 25mm
- ☐ Preceding symptoms of chest pain
- ☐ Atrial fibrillation on 24 hour holter monitoring
- ☐ Increased blood pressure during exercise

Genetic mutation in troponin T	24%
Left ventricular wall thickness 25mm	36%
Preceding symptoms of chest pain	10%
Atrial fibrillation on 24 hour holter monitoring	11%
Increased blood pressure during exercise	19%

Of those listed above, only one is an appropriate answer. Specific genetic mutations (such as in myosin binding protein C and troponin T) have been recognised as poor prognostic features in HOCM. B is incorrect as it is a ventricular wall thickness > 30mm that has been associated with a poor outcome. C is incorrect as it is preceding symptoms of syncope, not chest pain that is associated. Non sustained ventricular tachycardia, not atrial fibrillation, on holter monitoring is associated with a poor outcome, therefore D is incorrect. Finally, it would be a low blood pressure during exercise that would be associated with a poor prognosis therefore E is also an inappropriate answer.

The question in this case concerns poor prognostic features of hypertrophic obstructive cardiomyopathy. Of those listed above, the only appropriate answer of a poor prognostic feature is mutations in troponin T. The others are incorrect for the poor prognostic criteria

A 34-year-old woman is referred to cardiology as her primary care doctor has identified a systolic murmur. As part of the investigations she undergoes cardiac catheterisation. The following results are obtained from the right side of the heart:

	Oxygen saturation
Right atrium	71%
Right ventricle	82%
Pulmonary artery	81%

The left side of the heart is also assessed:

	Oxygen saturation
Left atrium	99%
Left ventricle	98%
Aorta	97%

What is the most likely diagnosis?

- ☐ Ventricular septal defect
- ☐ Patent ductus arteriosus
- ☐ Atrial septal defect with Eisenmenger's syndrome

Ventricular septal defect

56%

Patent ductus arteriosus

10%

Atrial septal defect with Eisenmenger's syndrome

9%

Atrial septal defect

10%

Ventricular septal defect with Eisenmenger's syndrome

14%

Dr. ASSE

A 65-year-old female is admitted with a suspected infective exacerbation of chronic obstructive pulmonary disease. On examination she is dyspnoeic with a blood pressure of 112/68 mmHg. Electrocardiogram shows an irregular, narrow-complex tachycardia with a rate of 130 bpm. At least three different P wave morphologies are seen. A diagnosis of multifocal tachycardia is suspected. What is the most appropriate management?

- ☐ Adenosine
- ☐ Digoxin
- ☐ Verapamil
- ☐ Atenolol
- ☐ DC cardioversion



A 62-year-old man is admitted with to the cardiology ward with infective endocarditis. Blood cultures grow *Streptococcus bovis*. What is the most appropriate investigation given the blood culture findings?

☐ Small bowel meal

☐ Bronchoscopy

☐ Cystoscopy

☐ Gastroscopy

☐ Colonoscopy

A 62-year-old man is admitted with to the cardiology ward with infective endocarditis. Blood cultures grow *Streptococcus bovis*. What is the most appropriate investigation given the blood culture findings?

Small bowel meal	4%
Bronchoscopy	4%
Cystoscopy	2%
Gastroscopy	4%
Colonoscopy	85%

Streptococcus bovis endocarditis is associated with colorectal cancer

Important for me Less important

A 57-year-old man who had a prosthetic mitral valve replacement 7 years ago presents with fever. An urgent echocardiogram shows features consistent with endocarditis. What is the most suitable antibiotic therapy until blood culture results are known?

- ☐ IV ceftriaxone + benzylpenicillin
- ☐ IV vancomycin + rifampicin + gentamicin
- ☐ IV benzylpenicillin + gentamicin
- ☐ IV flucloxacillin + gentamicin
- ☐ IV vancomycin + benzylpenicillin

IV ceftriaxone + benzylpenicillin	6%
IV vancomycin + rifampicin + gentamicin	57%
IV benzylpenicillin + gentamicin	17%
IV flucloxacillin + gentamicin	14%
IV vancomycin + benzylpenicillin	6%

If the patient has a prosthetic valve and endocarditis is suspected the initial therapy should consist of intravenous vancomycin + rifampicin + gentamicin. Please see the current BNF for more information.

Each one of the following is associated with aortic dissection, except:

- ☐ Ventricular septal defect
- ☐ Turner's syndrome
- ☐ Noonan's syndrome
- ☐ Pregnancy
- ☐ Marfan's syndrome

Ventricular septal defect

50%

Turner's syndrome

11%

Noonan's syndrome

14%

Pregnancy

20%

Marfan's syndrome

5%

A 24-year-old male is admitted with difficulties breathing. He states that he was at a restaurant having dinner when he noticed a rash on his arms, followed by nausea and difficulties with taking in a breath. On examination, there is generalised urticaria and swelling of his tongue and pharynx. There is audible inspiratory stridor. You treat him with intramuscular adrenaline, intravenous hydrocortisone, and intravenous chlorphenamine. He responds well to treatment.

You decide to monitor him on the ward thereafter. How long will you monitor the patient for?

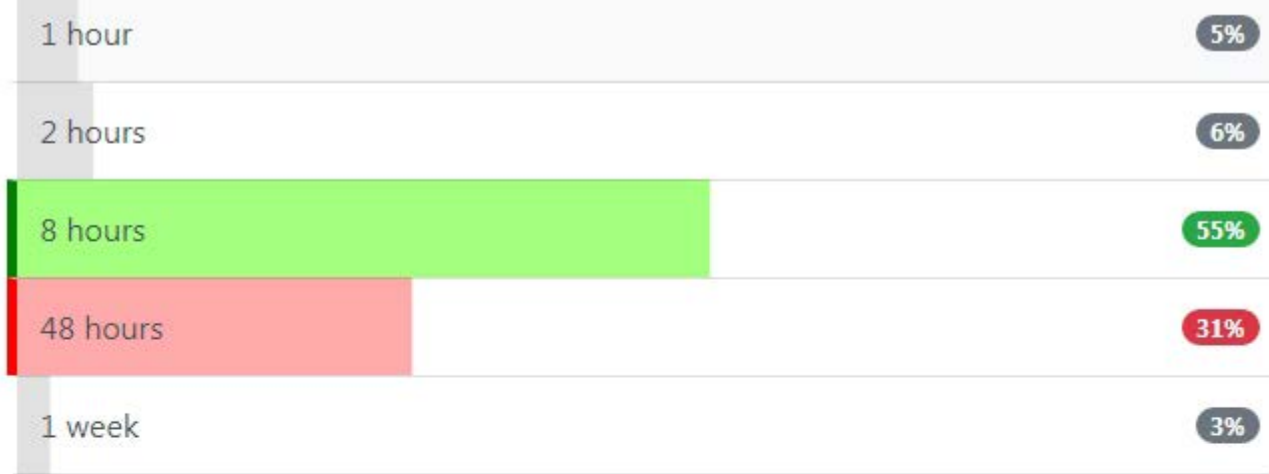
☐ 1 hour

☐ 2 hours

☐ 8 hours

☐ 48 hours

☐ 1 week



In anaphylaxis, biphasic reactions can occur in up to 20% of patients

Important for me Less important

The patient has clearly had an anaphylactic reaction which has been treated appropriately. A biphasic reaction includes a recurrence of symptoms that develops after apparent resolution of the initial reaction. Biphasic reactions have been reported to occur in 1%-20% of anaphylaxis episodes and typically occur about 8 hours after the first reaction, although recurrences have been reported up to 72 hours later.

Although there is no definite consensus on monitoring post anaphylaxis, most clinicians and local policies advise monitoring for a period of 6-8 hours after resolution of symptoms. Patients should be advised of the possibility of biphasic reactions and told to seek emergency medical care if they develop any of the symptoms or signs.

A 72-year-old man presents with lethargy and palpitations for the past four or five days. On examination his pulse is 123 bpm irregularly irregular, blood pressure is 118/70 mmHg and his chest is clear. An ECG confirms atrial fibrillation. What is the appropriate drug to control his heart rate?

☐ Amiodarone

☐ Bisoprolol

☐ Digoxin

☐ Amlodipine

☐ Flecainide

Amiodarone

10%

Bisoprolol

76%

Digoxin

6%

Amlodipine

2%

Flecainide

5%

Atrial fibrillation: rate control - beta blockers preferable to digoxin

Important for me Less important

A number of factors including age and symptoms would favour a rate control strategy. The NICE guidelines suggest either a beta-blocker or a rate limiting calcium channel blocker (i.e. Not amlodipine) in this situation.

Dr Assem

An 82-year-old man is referred to cardiology by his GP with increasing dyspnoea on exertion and a systolic murmur. Examination demonstrates a blood pressure of 100/80 mmHg and a slow rising pulse. What is the most likely cause of his underlying condition?

- ☐ Bicuspid aortic valve
- ☐ Ventricular septal defect
- ☐ Post rheumatic fever
- ☐ Calcification of the aortic valve
- ☐ Hypertrophic obstructive cardiomyopathy

Bicuspid aortic valve

6%

Ventricular septal defect

1%

Post rheumatic fever

2%

Calcification of the aortic valve

89%

Hypertrophic obstructive cardiomyopathy

3%

Aortic stenosis - most common cause:

- younger patients < 65 years: bicuspid aortic valve
- older patients > 65 years: calcification

Important for me Less important

This patient has aortic stenosis.

Dr Assem

A 32-year-old female patient presents with an 8-month history of progressively worsening shortness of breath, general fatigue and weight gain. There is no significant past medical history. In particular, there is no history of cardiorespiratory conditions. On examination, the patient is tachycardic with central cyanosis and general oedema. A chest radiograph shows cardiomegaly and dilatation of the pulmonary arteries. An echocardiogram suggests a raised pulmonary arterial pressure.

Which of the following is the mainstay treatment used for this condition?

☐ Bendroflumethiazide

☐ Aspirin

☐ Ramipril

☐ Prostacyclin

☐ Bisoprolol

Bendroflumethiazide	6%
Aspirin	3%
Ramipril	6%
Prostacyclin	81%
Bisoprolol	3%

Prostacyclins is used in the treatment of primary pulmonary hypertension

Important for me Less important

Prostacyclins are used in the treatment of primary pulmonary hypertension(PAH).

Bendroflumethiazide is not used to treat PAH but it can be used to treat heart failure and hypertension although not first-line for either.

Aspirin has no effect on PAH.

Ramipril and bisoprolol are not used to treat PAH but they are the first line treatments for heart failure.

You are a new speciality trainee in cardiology and in the middle of a busy outpatient clinic. Your next patient is a 27-year-old female with Arrhythmogenic Right Ventricular Dysplasia (ARVD) who is attending today for counselling/planning of prophylactic ICD insertion. She was diagnosed with this condition following the sudden death of her brother 2 years ago but has no history of problems herself.

Her echocardiogram (ECHO) done earlier today shows a moderately dilated and dyskinetic right ventricle with a mildly reduced ejection fraction which is similar to her last ECHO done around 18 months ago.

She is concerned as she drives to work every day and wants to know if there will be any restrictions to this.

What is the most appropriate thing to tell her?

- ☐ She will not be permitted to drive again with an ICD
- ☐ She will have to stop driving for 1 month only
- ☐ There are no restrictions so she can drive again immediately
- ☐ As she has had an ICD inserted she needs to wait 6 months before driving again
- ☐ She must have another ECHO after 1 month and if this is satisfactory can drive again

She will not be permitted to drive again with an ICD

9%

She will have to stop driving for 1 month only

47%

There are no restrictions so she can drive again immediately

14%

As she has had an ICD inserted she needs to wait 6 months before driving again

21%

She must have another ECHO after 1 month and if this is satisfactory can drive again

9%

The answer to this question relies on knowledge of DVLA guidelines but also in recognising that this is a prophylactic ICD not one for secondary prevention. The ECHO findings are a red herring as these are not actually mentioned in the guidance for this situation.

The correct answer is 1 month (B); E is incorrect as she is not required to have a further ECHO (unless concern) prior to driving again. If this was a secondary preventative ICD or following ICD shock therapy then the correct answer would be 6 months. A lifelong ban applies only to group 2 drivers.

A 53-year-old man is reviewed in the cardiology clinic with a history of chest pain and syncope. On examination he has an ejection systolic murmur radiating to the carotid area. What is the most likely cause of his symptoms?

- ☐ Bicuspid aortic valve
- ☐ Aortic root abscess
- ☐ Post rheumatic fever
- ☐ Posterior myocardial infarction
- ☐ Calcification of the aortic valve

Bicuspid aortic valve

56%

Aortic root abscess

5%

Post rheumatic fever

4%

Posterior myocardial infarction

3%

Calcification of the aortic valve

32%

Aortic stenosis - most common cause:

- younger patients < 65 years: bicuspid aortic valve
- older patients > 65 years: calcification

A 51-year-old man is started on lisinopril after being found to have an average blood pressure of 154/93 on ambulatory blood pressure monitoring. Around two weeks after starting treatment he represents with a persistent dry cough. Accumulation of which one of the following proteins is responsible for this?

- ☐ Adenosine
- ☐ Histamine
- ☐ Bradykinin
- ☐ Acetylcholine
- ☐ Neurokinin A

Adenosine

4%

Histamine

4%

Bradykinin

86%

Acetylcholine

4%

Neurokinin A

2%

Which one of the following radiotracers is used during cardiac Positron Emission Tomography (PET) scans?

- ☐ Gallium
- ☐ Fluorodeoxyglucose
- ☐ Technetium (^{99m}Tc)
- ☐ Thallium
- ☐ Fluorine-18

Gallium

9%

Fluorodeoxyglucose

46%

Technetium (^{99m}Tc)

31%

Thallium

9%

Fluorine-18

4%

Dr. Assem

Which one of the following is least associated with ST depression on ECG?

- ☐ Myocardial ischaemia
- ☐ Syndrome X
- ☐ Acute pericarditis
- ☐ Hypokalaemia
- ☐ Digoxin

Myocardial ischaemia

4%

Syndrome X

13%

Acute pericarditis

68%

Hypokalaemia

8%

Digoxin

8%

Dr. ASSE

A 74-year-old man presents for a medication review. Blood pressure is recorded as 184/72 mmHg. This is confirmed on two further occasions. What is the most appropriate first line therapy?

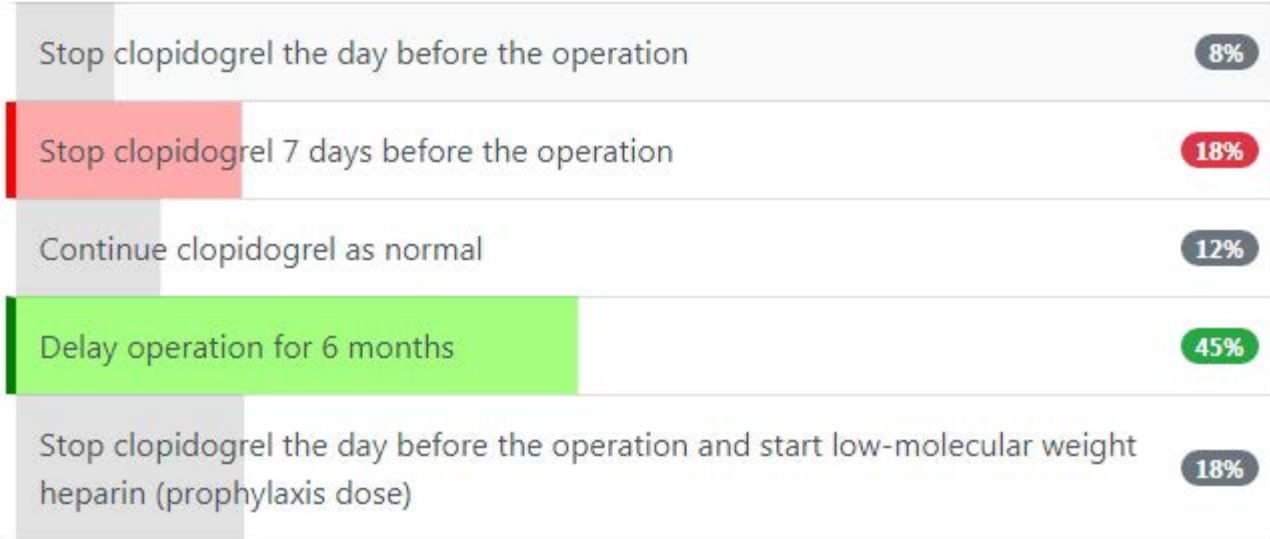
- ☐ Ramipril
- ☐ Losartan
- ☐ Bendroflumethiazide
- ☐ Amlodipine
- ☐ Atenolol



The 2011 NICE guidelines recommended treating isolated systolic hypertension the same way as standard hypertension. In this age group calcium channel blockers would be first-line.

You review a 60-year-old man who had a drug-eluting stent inserted 6 months ago for ischaemic heart disease. His current medication includes aspirin, clopidogrel, atorvastatin, ramipril and bisoprolol. He has developed an inguinal hernia and is keen for surgical repair. The cardiologists plan was to continue clopidogrel for 12 months following stent insertion. What is the most appropriate course of action?

- ☐ Stop clopidogrel the day before the operation
- ☐ Stop clopidogrel 7 days before the operation
- ☐ Continue clopidogrel as normal
- ☐ Delay operation for 6 months
- ☐ Stop clopidogrel the day before the operation and start low-molecular weight heparin (prophylaxis dose)



The AHA/ACC/SCAI/ACS/ADA published recommendations in 2007 stressed the importance of 12 months of dual antiplatelet therapy after placement of a drug-eluting stent (DES).

You are reviewing a 74-year-old man with hypertension, type 2 diabetes and osteoarthritis. He takes 10mg of ramipril once a day, 10mg of amlodipine once a day, indapamide 2.5 mg once a day, 500mg of Metformin twice a day, co-codamol PRN and atorvastatin 20mg at night.

His blood pressure (BP) is consistently raised on his home BP monitor and today in the clinic today is 158/95 mmHg. You would like to start a further medication to try and lower his BP. His K^+ is 4.0 mmol/l.

What would be the most appropriate next medication to add according to the NICE guidelines?

☐ Bendroflumethiazide

☐ Chlortalidone

☐ Candesartan

☐ Spironolactone

☐ Doxazosin

Chlortalidone	5%
Candesartan	4%
Spironolactone	74%
Doxazosin	7%

Poorly controlled hypertension, already taking an ACE inhibitor, calcium channel blocker and a thiazide diuretic. $K^+ < 4.5 \text{ mmol/l}$ - add spironolactone

Important for me Less important

This patient has resistant hypertension as he is already on three agents to try and control his BP. He is already taking an ACE-inhibitor (ramipril) and a calcium channel blocker (amlodipine) at the maximum doses. He is also taking a thiazide-like diuretic (indapamide). The next step would be to add spironolactone if the K^+ is $< 4.5 \text{ mmol/l}$. Therefore, option 4, spironolactone is the correct answer.

If his K^+ was $> 4.5 \text{ mmol/l}$, the next step would be to consider higher-dose thiazide-like diuretic treatment.

Bendroflumethiazide is a conventional thiazide diuretic which is inappropriate here as the patient is on indapamide. Chlortalidone is a thiazide-like diuretic (as is indapamide) so is inappropriate to add in. Candesartan is an angiotensin receptor blocker and shouldn't be used in combination with an ACE-inhibitor. Doxazosin is an alpha blocker which is used if further diuretic therapy is not tolerated.

A 70-year-old man presented to the emergency department following a fall and head injury. This is his third fall in the past 12 months. He has a background of persistent atrial fibrillation, type 2 diabetes mellitus and Parkinson's disease. He is taking apixaban 5mg BD, bisoprolol 5mg OD, co-beneldopa 100mg QDS, and metformin 1g BD.

CT head reveals no acute findings.

What is the most appropriate management regarding his anticoagulation?

- ☐ Stop apixaban for now, optimise his Parkinson's medication, and consider restarting in 6 months
- ☐ Switch to aspirin
- ☐ Stop anticoagulation
- ☐ Stop apixaban for now, optimise his Parkinson's medication, and consider starting warfarin in 6 months
- ☐ Continue apixaban

Stop apixaban for now, optimise his Parkinson's medication, and consider restarting in 6 months

15%

Switch to aspirin

7%

Stop anticoagulation

8%

Stop apixaban for now, optimise his Parkinson's medication, and consider starting warfarin in 6 months

17%

Continue apixaban

53%

Risk of falls alone is not sufficient reasoning to withhold anticoagulation

Important for me Less important

Do not withhold anticoagulation solely because of the risk of falls (NICE CG180). There is no other reason to consider withdrawing anticoagulation here. One study used experimental modelling to conclude that a patient with a 5% annual stroke risk (CHADS 2-3) would need to fall approximately 295 times per year for the benefits of anticoagulation to be out-weighed by the risk of fall-related intracranial haemorrhage. All of the other answers involve stopping or pausing oral anticoagulation and are therefore incorrect.

Which one of the following features would best indicate severe aortic stenosis?

- ☐ Valvular gradient of 35 mmHg
- ☐ Quiet first heart sound
- ☐ Loudness of ejection systolic murmur
- ☐ Fourth heart sound
- ☐ Development of an opening snap

Valvular gradient of 35 mmHg

17%

Quiet first heart sound

15%

Loudness of ejection systolic murmur

16%

Fourth heart sound

41%

Development of an opening snap

11%

Aortic stenosis - S4 is a marker of severity

Important for me Less important

Six weeks after having a prosthetic heart valve a patient develops infective endocarditis. What is the most likely causative organism?

- ☐ *Streptococcus viridans*
- ☐ *Staphylococcus epidermidis*
- ☐ *Staphylococcus aureus*
- ☐ *Streptococcus bovis*
- ☐ One of the HACEK group

Streptococcus viridans

15%

Staphylococcus epidermidis

52%

Staphylococcus aureus

28%

Streptococcus bovis

3%

One of the HACEK group

2%

Most common cause of endocarditis:

- *Staphylococcus aureus*
- *Staphylococcus epidermidis* if < 2 months post valve surgery

Important for me Less important

Coagulase-negative staphylococci such as *Staphylococcus epidermidis* are the most common causative organisms in the first 2 months following surgery. After this time the spectrum of organisms causing endocarditis returns to normal.

You have ordered a B-type natriuretic peptide (BNP) test on a patient with suspected heart failure. It has come back as being slightly elevated. Which one of the following factors may account for a falsely elevated BNP?

- ☐ ACE inhibitor therapy
- ☐ Beta-blocker therapy
- ☐ Furosemide therapy
- ☐ Obesity
- ☐ COPD

You have ordered a B-type natriuretic peptide (BNP) test on a patient with suspected heart failure. It has come back as being slightly elevated. Which one of the following factors may account for a falsely elevated BNP?



An obese 45-year-old male, with known hyperlipidaemia and peripheral vascular disease, presents with a right parietal ischaemic stroke. He reports trouble sleeping and laying flat at night that began after a flu-like illness 3 months ago, and reports some exertional dyspnoea. Which of the following investigations are most likely to find the cause of the stroke?

- ☐ Echocardiogram
- ☐ CT brain with angiography
- ☐ Magnetic resonance imaging / Magnetic resonance angiography(MRI/MRA)
- ☐ Carotid doppler of carotid vessels
- ☐ CT Chest with contrast

Echocardiogram	66%
CT brain with angiography	5%
Magnetic resonance imaging / Magnetic resonance angiography(MRI/MRA)	10%
Carotid doppler of carotid vessels	12%
CT Chest with contrast	7%

The underlying diagnosis is a viral myocarditis precipitating a dilated cardiomyopathy and causing a cardioembolic stroke. Previously, the enteroviruses (including coxsackievirus) were the most common identified viruses. Currently, parvovirus B-19 and human herpes virus 6 are considered the most common causes of viral myocarditis. The echo may show reduced left ventricular ejection fraction, myocardial dyssynchrony (myocardial segments contract at different points in time), thinning of the left ventricular wall and a dilated left ventricle. Trouble sleeping and laying flat at night and the exertional dyspnoea after a flu-like illness are key features suggestive of a viral myocarditis.

CT brain and MRI/MRA will show the effect of the stroke, and not the cause. Carotid doppler ultrasonography of the carotids will not show the cause, as the cause is cardioembolic stroke.

A 67-year-old man with a history of chronic obstructive pulmonary disease and ischaemic heart disease is taken to the Emergency Department with dyspnoea. On examination his respiratory rate is 24 / min, JVP is not elevated and crackles are heard in both lung bases. Which other finding would most strongly indicate that his dyspnoea is secondary to isolated left ventricular failure?

- ☐ Pulsus paradoxus
- ☐ Gallop rhythm
- ☐ Tachycardia
- ☐ Peripheral oedema
- ☐ Cardiomegaly on chest x-ray

Pulsus paradoxus

17%

Gallop rhythm

59%

Tachycardia

2%

Peripheral oedema

11%

Cardiomegaly on chest x-ray

11%

Gallop rhythm (S3) is an early sign of LVF

Important for me Less important

Whilst all of the above features may be seen in patients with left ventricular failure a gallop rhythm is one of the most specific and early signs

Dr Assem

A 24-year-old woman who is 34 weeks pregnant presents with pleuritic chest pain and shortness of breath. She has noticed some pain in her left calf for the past 3 days and on examination she has clinical signs consistent with a left calf deep vein thrombosis. What is the most appropriate investigation?

- ☐ D-dimer
- ☐ Compression duplex Doppler
- ☐ Computed tomographic pulmonary angiography
- ☐ Venogram
- ☐ Ventilation-perfusion scan

D-dimer	5%
Compression duplex Doppler	37%
Computed tomographic pulmonary angiography	21%
Venogram	3%
Ventilation-perfusion scan	34%

Confirming a DVT is the first step as this may provide indirect evidence of a pulmonary embolism. As both conditions require anticoagulation this may negate the need for further radiation exposure.

A 64-year-old man is admitted to the Emergency Department with chest pain radiating through to his back. On examination pulse 90 regular, BP 140/90. A CXR shows mediastinal widening. A CT shows dissection of the descending aorta. What is the most suitable initial management?

- ☐ Observe only
- ☐ IV labetalol
- ☐ IV sodium nitroprusside
- ☐ Immediate surgical referral
- ☐ Oral verapamil

Observe only	7%
IV labetalol	66%
IV sodium nitroprusside	7%
Immediate surgical referral	17%
Oral verapamil	3%

Aortic dissection

- type A - ascending aorta - control BP(IV labetalol) + surgery
- type B - descending aorta - control BP(IV labetalol)

Important for me Less important

Dissection of the descending aorta indicates a type B dissection, which should be managed medically with IV labetalol

Dr Assem

A 30-year-old woman is admitted to the Emergency Department following the acute onset of palpitations. Blood pressure is 124/84 mmHg and her pulse is 150/min. An ECG shows a narrow complex tachycardia. Intravenous access is gained and 6mg of adenosine is given with no effect. What is the most appropriate next step?

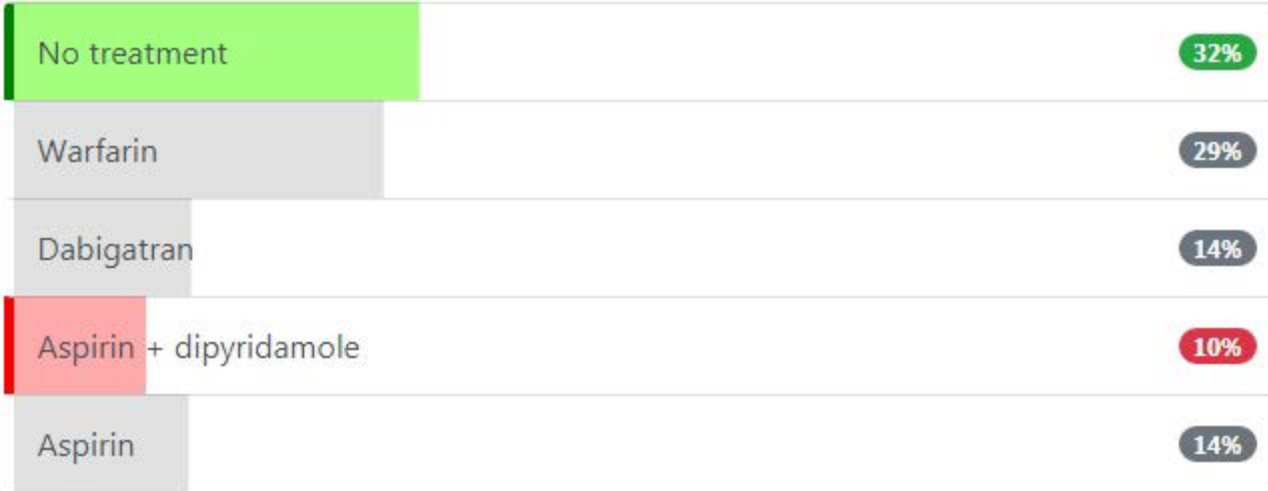
- ☐ Intravenous adenosine 12 mg
- ☐ Intravenous adenosine 6mg
- ☐ Intravenous verapamil 2.5-5 mg
- ☐ Radio-frequency ablation
- ☐ Electrical cardioversion



A further dose of adenosine should be given if there is no response to the initial injection. Please see the Resuscitation Council (UK) link for further details.

A 54-year-old male with no past medical history is found to be in atrial fibrillation during a consultation regarding a sprained ankle. He reports no history of palpitations or dyspnoea. After discussing treatment options he elects not to be cardioverted. Examination of the cardiovascular system is otherwise unremarkable with a blood pressure of 118/76 mmHg. According to the latest NICE guidelines, if the patient remains in chronic atrial fibrillation what is the most suitable treatment to offer?

- ☐ No treatment
- ☐ Warfarin
- ☐ Dabigatran
- ☐ Aspirin + dipyridamole
- ☐ Aspirin



Young man with AF, no TIA or risk factors, no treatment is now preferred to aspirin

Important for me Less important

The CHA₂DS₂-VASc score for this man is 0. NICE therefore recommend that he does not require anticoagulation.

A 65-year-old man is discharged from hospital following a thrombolysed ST-elevation myocardial infarction. Other than a history of depression he has no past medical history of note. Examination of his cardiorespiratory system today was normal. His stay on the coronary care unit was complicated by the development of dyspnoea and an echo show a reduced left ventricular ejection fraction. Other than standard treatment with an ACE inhibitor, beta-blocker, aspirin, clopidogrel and statin, what other type of drug should he be taking?

- ☐ Angiotensin 2 receptor antagonist
- ☐ Potassium channel activator
- ☐ Aldosterone antagonist
- ☐ Thiazide diuretic
- ☐ Loop diuretic

Angiotensin 2 receptor antagonist

6%

Potassium channel activator

4%

Aldosterone antagonist

58%

Thiazide diuretic

9%

Loop diuretic

23%

An aldosterone antagonist is recommended by current NICE guidelines as the patient has a reduced left ventricular ejection fraction. A loop diuretic is not indicated unless there is evidence of fluid overload.

A 61-year-old woman is admitted to the Emergency Department with central chest pain. It feels like her previous angina but is not relieved by nitrates. She has a history of ischaemic heart disease and 4 weeks ago underwent a percutaneous coronary intervention during which a stent was placed. This is her first episode of angina since the procedure. What is the most likely diagnosis?

- ☐ Pericarditis
- ☐ Aortic dissection
- ☐ Coronary artery dissection
- ☐ Restenosis
- ☐ Stent thrombosis

A 61-year-old woman is admitted to the Emergency Department with central chest pain. It feels like her previous angina but is not relieved by nitrates. She has a history of ischaemic heart disease and 4 weeks ago underwent a percutaneous coronary intervention during which a stent was placed. This is her first episode of angina since the procedure. What is the most likely diagnosis?



A 58-year-old man presents to the Emergency Department following an episode of transient right-sided weakness which lasted approximately 20 minutes. He has had two previous episodes of a similar nature. On examination he is found to be in atrial fibrillation at a rate of 80 bpm.

CT head	normal
---------	--------

He is started on aspirin 300mg od. Two days later he has a carotid doppler which is normal. What is the most appropriate management?

- ☐ Start digoxin
- ☐ Switch to aspirin 300mg od + dipyridamole 200mg bd long-term
- ☐ Wait two weeks from the date of the last event then switch from aspirin to warfarin
- ☐ Switch to aspirin 75mg od long-term
- ☐ Start warfarin

Start digoxin

4%

Switch to aspirin 300mg od + dipyridamole 200mg bd long-term

4%

Wait two weeks from the date of the last event then switch from aspirin to warfarin

37%

Switch to aspirin 75mg od long-term

10%

Start warfarin

46%

This patient has atrial fibrillation. As a consequence he has had a number of transient ischaemic attacks (TIAs) and hence needs to be anticoagulated with warfarin.

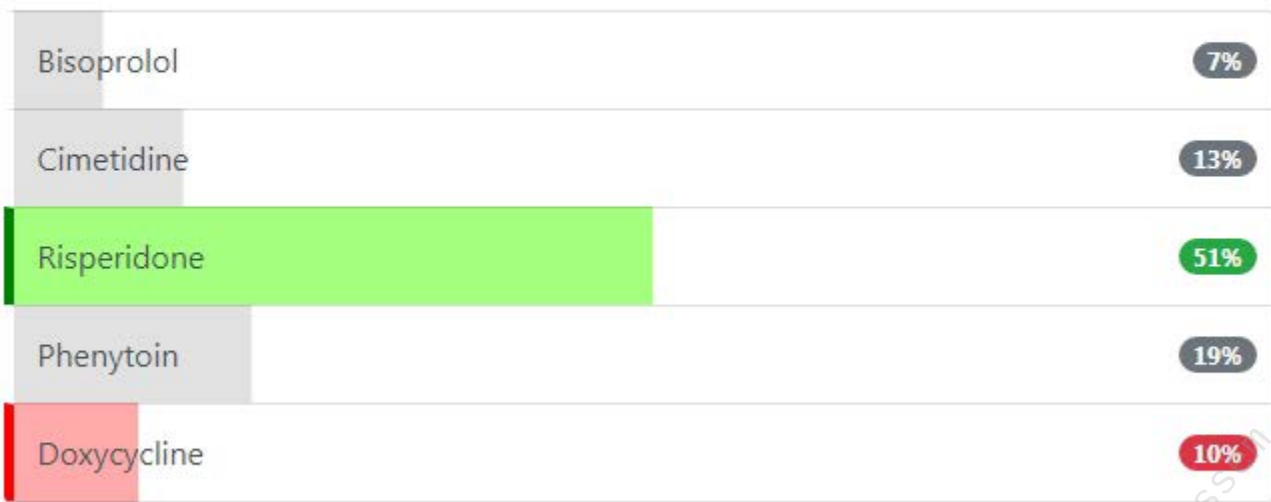
In patients who've had an ischaemic stroke the guidelines recommend waiting two weeks before anticoagulation is commenced to reduce the risk of haemorrhagic transformation. However, NICE recommend for TIA patients: 'in the absence of cerebral infarction or haemorrhage, anticoagulation therapy should begin as soon as possible.'

Dr Assen

A 52-year-old man is admitted to the Emergency Department. He was found collapsed by neighbours. An ECG on arrival shows torsades de pointes. Which one of his medications is most likely to have contributed to this presentation?

- ☐ Bisoprolol
- ☐ Cimetidine
- ☐ Risperidone
- ☐ Phenytoin
- ☐ Doxycycline

A 52-year-old man is admitted to the Emergency Department. He was found collapsed by neighbours. An ECG on arrival shows torsades de pointes. Which one of his medications is most likely to have contributed to this presentation?



A 68-year-old man is admitted with central crushing chest pain and raised cardiac enzymes was diagnosed with myocardial infarction (MI). In addition to ST segment changes, his ECG also showed new second-degree heart block.

In light of this, which myocardial territory is most likely to have been affected?

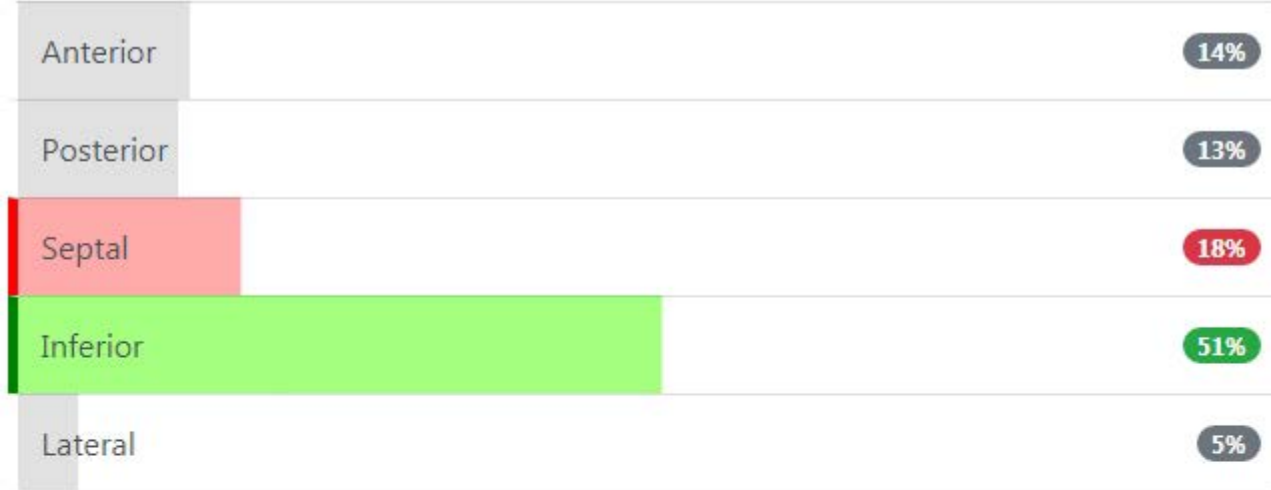
☐ Anterior

☐ Posterior

☐ Septal

☐ Inferior

☐ Lateral



AV block can occur following an inferior MI

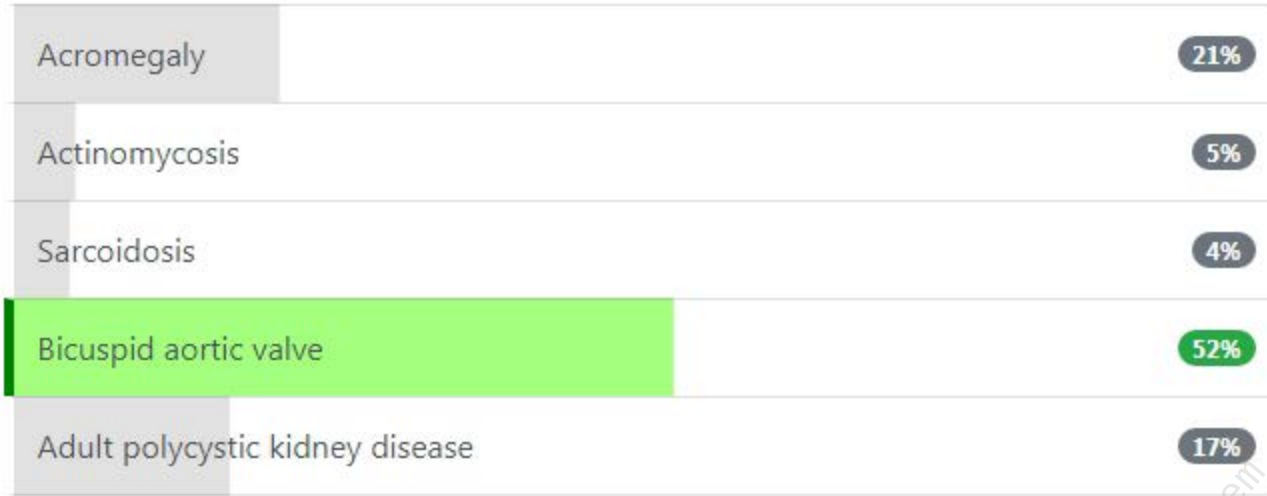
Important for me Less important

The patient has developed second-degree heart block, a type of atrioventricular block, as a complication of his myocardial infarction (MI). Atrioventricular block most commonly follows an inferior MI.

Infarctions affecting the other myocardial territories, listed in the options, are less likely to cause an atrioventricular block.

Which one of the following conditions is most associated with aortic dissection?

- ☐ Acromegaly
- ☐ Actinomycosis
- ☐ Sarcoidosis
- ☐ Bicuspid aortic valve
- ☐ Adult polycystic kidney disease



A bicuspid aortic valve increases the risk of aortic dissection six-fold

You review a patient who has been admitted with a non-ST elevation myocardial infarction in the Emergency Department. They have so far been treated with aspirin 300mg stat and glyceryl trinitrate spray (2 puffs). Following recent NICE guidance, which patients should receive ticagrelor?

- ☐ Patients < 75 years of age
- ☐ Patients who have a history of hypertension, ischaemic heart disease or diabetes mellitus
- ☐ Those who have a predicted 12 month mortality > 10%
- ☐ Those who have a predicted 6 month mortality < 10%
- ☐ All patients

Patients < 75 years of age

5%

Patients who have a history of hypertension, ischaemic heart disease or diabetes mellitus

10%

Those who have a predicted 12 month mortality > 10%

13%

Those who have a predicted 6 month mortality < 10%

5%

All patients

66%

A patient is given aspirin 300 mg after developing an acute coronary syndrome. What is the mechanism of action of aspirin to achieve an antiplatelet effect?

- ☐ Inhibits the production of thromboxane A₂
- ☐ Inhibits ADP binding to its platelet receptor
- ☐ Inhibits the production of prostaglandin H₂
- ☐ Glycoprotein IIb/IIIa receptor antagonist
- ☐ Inhibits the production of prostacyclin (PGI₂)

Inhibits the production of thromboxane A₂

74%

Inhibits ADP binding to its platelet receptor

10%

Inhibits the production of prostaglandin H₂

7%

Glycoprotein IIb/IIIa receptor antagonist

4%

Inhibits the production of prostacyclin (PGI₂)

5%

A 45-year-old woman suffered from sudden onset central crushing chest pain. Her electrocardiogram showed ST-segment elevation. Troponin is slightly raised. She was rushed for an emergency invasive angiogram but this revealed slight wall irregularities with no luminal obstruction. Subsequently, cardiovascular MR (CMR) showed an apical ballooning of the myocardium resembling an octopus pot.

She did not have any significant past medical history. There is a family history of premature coronary artery disease. Her partner recently passed away of prostate cancer.

What is the most likely cause of the ST-segment elevation?

- ☐ Coronary artery disease
- ☐ Takotsubo cardiomyopathy
- ☐ Left ventricular aneurysm
- ☐ Myocardial infarction
- ☐ Hypertrophic cardiomyopathy

Coronary artery disease

4%

Takotsubo cardiomyopathy

70%

Left ventricular aneurysm

17%

Myocardial infarction

4%

Hypertrophic cardiomyopathy

5%

Takotsubo cardiomyopathy is a differential for ST-elevation in someone with no obstructive coronary artery disease

Important for me [Less important](#)

The differential diagnosis for ST-elevation:

- myocardial infarction
- pericarditis/myocarditis
- normal variant - 'high take-off'
- Takotsubo cardiomyopathy
- Left ventricular aneurysm
- Prinzmetal angina
- Subarachnoid haemorrhage

An 85-year-old man is admitted on the medical take with a 4 day history of a productive cough, followed by 2 days of shortness of breath, fever and confusion. He has an obvious shadow over the lower zone of his left lung on chest x-ray which was not there on a routine x-ray one month earlier. He has a past medical history of asthma, ischaemic heart disease and gallstones. Which of the following is most strongly associated with a poor prognosis?

- ☐ CURB-65 score of 3
- ☐ Past medical history of asthma
- ☐ Ex-smoker
- ☐ Patient meets criteria for sepsis
- ☐ Saturations of 92% on 8 litres of oxygen via non-rebreathe mask

CURB-65 score of 3	58%
Past medical history of asthma	2%
Ex-smoker	7%
Patient meets criteria for sepsis	16%
Saturations of 92% on 8 litres of oxygen via non-rebreathe mask	16%

The CURB-65 score can be used for assessing the prognosis of a patient with community acquired pneumonia

Important for me Less important

This patient has community-acquired pneumonia. The CURB-65 score is used to assess prognosis and risk of mortality in patients with community-acquired pneumonia. The full score can be found in the background notes. A higher score is linked to a higher risk of in-hospital mortality.

Having asthma, being an ex-smoker, being septic or having a significant oxygen requirement are likely all associated with worse prognosis but do not have the strength of evidence behind them to compare to the CURB-65 score.

NICE pathways - assessment of community-acquired pneumonia

<https://pathways.nice.org.uk/.../assessment-of-community-acquired-pneumonia.pdf>

A 76-year-old female is admitted after being found on the floor at her home. On examination she has a core temperature of 30°C. Her serum electrolytes are within normal range. Which one of the ECG findings is most likely to be seen?

- ☐ Long QT interval
- ☐ 'U' waves
- ☐ Short PR interval
- ☐ Second degree heart block
- ☐ Flattened T waves

Long QT interval

56%

'U' waves

21%

Short PR interval

7%

Second degree heart block

8%

Flattened T waves

8%

Eight months after having a prosthetic heart valve a patient develops infective endocarditis. What is the most likely causative organism?

- ☐ *Streptococcus viridans*
- ☐ *Staphylococcus aureus*
- ☐ *Staphylococcus epidermidis*
- ☐ *Coxiella burnetii*
- ☐ One of the HACEK group

Streptococcus viridans

17%

Staphylococcus aureus

59%

Staphylococcus epidermidis

20%

Coxiella burnetii

1%

One of the HACEK group

3%

Most common cause of endocarditis:

- *Staphylococcus aureus*
- *Staphylococcus epidermidis* if < 2 months post valve surgery

Important for me Less important

Coagulase-negative staphylococci such as *Staphylococcus epidermidis* are the most common causative organisms in the first 2 months following surgery. After this time the spectrum of organisms causing endocarditis returns to normal.

A 67-year-old man is admitted with palpitations. During examination of his JVP he is noted to have regular cannon waves. Which one of the following arrhythmias is most likely to be responsible for this finding?

- ☐ Atrio-ventricular nodal re-entry tachycardia
- ☐ Atrial fibrillation
- ☐ Atrial flutter
- ☐ Complete heart block
- ☐ Ventricular fibrillation

Atrio-ventricular nodal re-entry tachycardia

39%

Atrial fibrillation

8%

Atrial flutter

10%

Complete heart block

36%

Ventricular fibrillation

7%

Atrio-ventricular nodal re-entry tachycardia and ventricular tachycardia with 1:1 ventricular-atrial conduction may produce regular cannon waves. Complete heart block causes irregular cannon waves

Which one of the following drugs is best avoided in patients with hypertrophic obstructive cardiomyopathy?

☐ Amiodarone

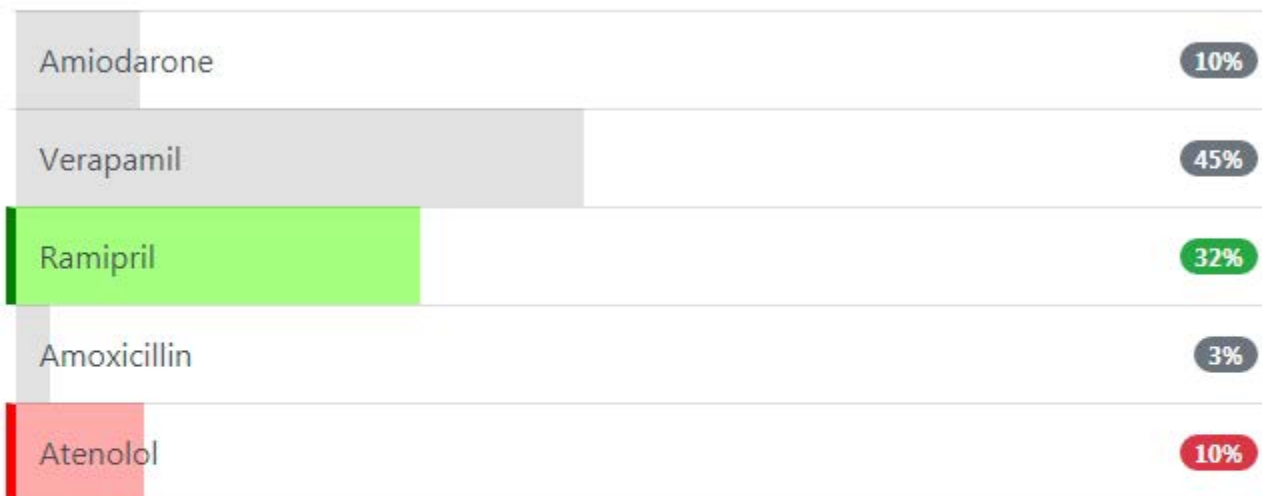
☐ Verapamil

☐ Ramipril

☐ Amoxicillin

☐ Atenolol

Which one of the following drugs is best avoided in patients with hypertrophic obstructive cardiomyopathy?



ACE-inhibitors should be avoided in patients with HOCM

Important for me Less important

Verapamil should however be avoided in patients with coexistent Wolff-Parkinson White as it may precipitate VT or VF

A 14-year-old boy is admitted with palpitations and is noted to have a long QT interval. His only past medical history is deafness. What is the likely diagnosis?

- ☐ Leriche's syndrome
- ☐ Wolff-Parkinson White syndrome
- ☐ Jervell-Lange-Nielsen syndrome
- ☐ Romano-Ward syndrome
- ☐ Osler-Weber-Rendu syndrome

Leriche's syndrome	4%
Wolff-Parkinson White syndrome	3%
Jervell-Lange-Nielsen syndrome	63%
Romano-Ward syndrome	22%
Osler-Weber-Rendu syndrome	9%

Inherited long QT syndrome, sensorineural deafness - Jervell and Lange-Nielsen syndrome

Important for me Less important

Jervell-Lange-Nielsen syndrome is associated with profound deafness and a prolonged QT interval

A 74-year-old woman is reviewed. She recently had ambulatory blood pressure monitoring that showed an average reading of 142/90 mmHg. There is no significant past medical history of note other than hypothyroidism. Her 10-year cardiovascular risk score is 23%. What is the most appropriate management?

- ☐ Start amlodipine
- ☐ Start bendroflumethiazide
- ☐ No treatment required - monitor blood pressure every year
- ☐ Start ramipril
- ☐ Repeat ambulatory blood pressure monitoring

Start amlodipine

64%

Start bendroflumethiazide

3%

No treatment required - monitor blood pressure every year

10%

Start ramipril

15%

Repeat ambulatory blood pressure monitoring

8%

Newly diagnosed patient with hypertension (> 55 years) - add a calcium channel blocker

Important for me Less important

The average reading is above the treatment threshold for patients below the age of 80 years. Treatment with a calcium channel blocker should therefore be started.

A patient who was commenced on a simvastatin six months ago presents with generalised muscles aches. Which one of the following is not a risk factor for statin-induced myopathy?

- ☐ Female gender
- ☐ Large fall in LDL-cholesterol
- ☐ Low body mass index
- ☐ Advanced age
- ☐ History of diabetes mellitus

Female gender

16%

Large fall in LDL-cholesterol

51%

Low body mass index

16%

Advanced age

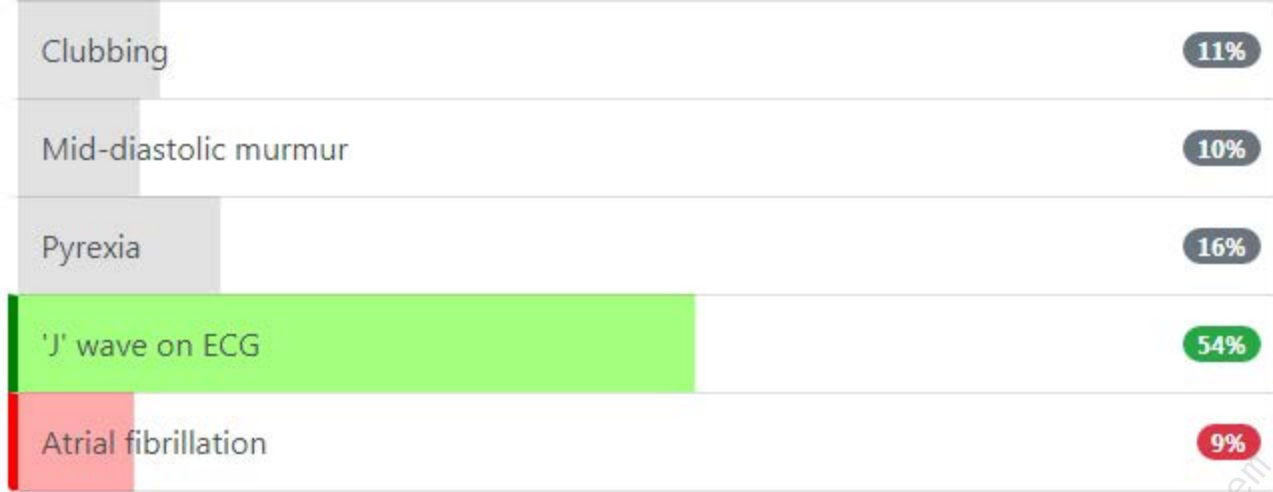
6%

History of diabetes mellitus

12%

Each one of the following is associated with atrial myxoma, except:

- ☐ Clubbing
- ☐ Mid-diastolic murmur
- ☐ Pyrexia
- ☐ 'J' wave on ECG
- ☐ Atrial fibrillation



A 'J' wave is seen in hypothermia

Which one of the following electrolyte disturbances is most associated with the development of a prolonged QT interval on ECG?

- ☐ Hyponatraemia
- ☐ Hypocalcaemia
- ☐ Hyperkalaemia
- ☐ Hypercalcaemia
- ☐ Hypophosphataemia

Hyponatraemia

6%

Hypocalcaemia

73%

Hyperkalaemia

9%

Hypercalcaemia

8%

Hypophosphataemia

5%

Hypocalcemia is associated with QT interval prolongation; Hypercalcemia is associated with QT interval shortening

Important for me Less important

Dr Assem

Which of the following is least associated with mitral valve prolapse?

- ☐ Osteogenesis imperfecta
- ☐ Pseudoxanthoma elasticum
- ☐ Turner's syndrome
- ☐ Marfan's syndrome
- ☐ Acromegaly



Whilst some patients with acromegaly have mitral valve prolapse (MVP) it is not a common association. It should be remembered that the prevalence of MVP in a standard population is around 5-10%

Which one of the following clinical signs would best indicate severe calcified aortic stenosis?

- ☐ Loudness of murmur
- ☐ Loud second heart sound
- ☐ Radiation to the carotids
- ☐ Hypertension
- ☐ Displaced apex beat

Which one of the following clinical signs would best indicate severe calcified aortic stenosis?



The apex beat is not normally displaced in aortic stenosis. Displacement would indicate left ventricular dilatation and hence severe disease

A 62-year-old female with a history of mitral regurgitation attends her dentist, who intends to perform dental polishing. She is known to be penicillin allergic. What prophylaxis against infective endocarditis should be given?

- ☐ Oral doxycycline
- ☐ Oral erythromycin
- ☐ No antibiotic prophylaxis needed
- ☐ Oral ofloxacin
- ☐ Oral clindamycin



Antibiotic prophylaxis to prevent infective endocarditis is not routinely recommended in the UK for dental and other procedures

Important for me Less important

The 2008 NICE guidelines have fundamentally changed the approach to infective endocarditis prophylaxis

A 63-year-old female on long-term warfarin for atrial fibrillation attends the anticoagulation clinic. Despite having a stable INR for the past 4 years on the same dose of warfarin her INR is measured at 5.4. Which one of the following is most likely to be responsible?

- ☐ St John's Wort
- ☐ Smoking
- ☐ Carrot juice
- ☐ Cranberry juice
- ☐ Camomile tea



St John's Wort is an inducer of the P450 enzyme system so would cause the INR to decrease, rather than increase.

A 60-year-old man presents with increasing shortness-of-breath on exertion. During the examination a third heart sound is heard. Examination of the respiratory system is unremarkable. Which one of the following is most consistent with this finding?

- ☐ Dilated cardiomyopathy
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Atrial fibrillation
- ☐ Mitral stenosis
- ☐ Normal variant

Dilated cardiomyopathy

59%

Hypertrophic obstructive cardiomyopathy

14%

Atrial fibrillation

3%

Mitral stenosis

13%

Normal variant

11%

A third heart sound is only considered a normal variant in patients < 30 years of age.

A 64-year-old man who is known to have ischaemic heart disease is due to start a chemotherapy regime which includes doxorubicin. His cardiologist wants to accurately assess his left ventricular function as he is concerned the doxorubicin may damage his myocardium. Which one of the following is the most accurate method to determine his left ventricular function?

- ☐ Cardiac computed tomography
- ☐ Echocardiography
- ☐ Exercise ECG
- ☐ MUGA scan
- ☐ Coronary angiography

Cardiac computed tomography

9%

Echocardiography

40%

Exercise ECG

5%

MUGA scan

40%

Coronary angiography

6%

A 62-year-old man is examined in the cardiology clinic. During cardiac auscultation it is noted that the pulmonary component of the second heart sound occurs before the aortic. Which one of the following is associated with this finding?

- ☐ Pulmonary stenosis
- ☐ Left bundle branch block
- ☐ Right bundle branch block
- ☐ Atrial septal defect
- ☐ Deep inspiration

Pulmonary stenosis

20%

Left bundle branch block

45%

Right bundle branch block

11%

Atrial septal defect

11%

Deep inspiration

12%

Second heart sound (S2)

- loud: hypertension
- soft: AS
- fixed split: ASD
- reversed split: LBBB

Important for me Less important

Left bundle branch block causes a reversed split second heart sound. Atrial septal defects cause fixed splitting of S2

A 72-years-old lady attends to her general practitioner with a history of diabetes mellitus, hyperlipidaemia, hypertension, hypertensive cardiomyopathy, atrial fibrillation and polymyalgia rheumatica. She had a non-displaced humeral shaft fracture 3 years ago treated non-operatively. She is currently taking atorvastatin, warfarin, furosemide, bendroflumethiazide and a low dose of prednisolone. Which of the following drugs can increase the osseous matter and decrease the further risk of fracture by decreasing the amount of calcium excreted by the kidneys?

- ☐ Atorvastatin
- ☐ Warfarin
- ☐ Furosemide
- ☐ Bendroflumethiazide
- ☐ Prednisolone



Thiazide diuretics can cause hyponatraemia, metabolic alkalosis, hypokalaemia and hypocalciuria

Important for me Less important

Thiazide diuretics can cause hyponatraemia, metabolic alkalosis, hypokalaemia and hypocalciuria. They can conserve calcium by decreasing its excretion by kidneys, whereas loop diuretics (such as furosemide) and cause increase calcium excretion and decrease serum calcium levels. Prednisolone as any other steroid can shift the calcium from the bone to the kidneys to be excreted, possibly causing steroid-induced osteoporosis. Atorvastatin and warfarin do not interfere with calcium homeostasis significantly.

A 67-year-old diabetic gentleman who recently underwent aortic valve replacement presented with a fever, raised inflammatory markers and deranged renal function. Which one of the following organisms contribute to the highest rate of mortality in patients with his condition?

- ☐ Enterococci
- ☐ Streptococci
- ☐ Staphylococci
- ☐ Pseudomonas
- ☐ HACEK Organisms

Streptococci

14%

Staphylococci

66%

Pseudomonas

5%

HACEK Organisms

11%

Staphylococci is the leading organism contributing to mortality in infective endocarditis

Important for me Less important

Staph aureus followed by coagulase-negative staphylococci are two of the most common organisms causing infective endocarditis.

Enterococci - Belongs to the bowel organisms group and contributes to only 15% of mortality.

Streptococci - Only contribute to around 5% of mortality.

Pseudomonas - Rare cause of endocarditis, occurs when infected water enters the bloodstream.

HACEK Organisms - Lives on dental gums and are more common in intravenous drug users.

Dr. Arsem

A 65-year-old man is admitted to the Emergency Department with chest pain, nausea and feeling lethargic. He has a history of type 1 diabetes mellitus and is known to have chronic kidney disease stage 4 secondary to diabetic nephropathy. An ECG taken on admission shows widespread ST elevation. Bloods tests show the following:

Na ⁺	140 mmol/l
K ⁺	5.8 mmol/l
Urea	26 mmol/l
Creatinine	305 µmol/l

His renal function one month ago was as follows:

Na ⁺	142 mmol/l
K ⁺	4.9 mmol/l
Urea	7.9 mmol/l
Creatinine	199 µmol/l

An echocardiogram shows a small effusion. What is the most appropriate next step in management?

- ☒ Oral colchicine
- ☐ Pericardiectomy



This patient has uraemic pericarditis. Haemodialysis is urgently required to correct the uraemia which in turn will improve the symptoms of pericarditis.

A 24-year-old female develops transient slurred speech following a flight from Australia to the United Kingdom. Both a CT head and ECG are normal. Which one of the following tests is most likely to reveal the underlying cause?

- ☐ Transoesophageal echo
- ☐ MRI brain
- ☐ Carotid USS Doppler
- ☐ Cerebral angiogram
- ☐ Transthoracic echo

Transoesophageal echo

38%

MRI brain

13%

Carotid USS Doppler

17%

Cerebral angiogram

9%

Transthoracic echo

22%

Paradoxical embolus - PFO most common cause - do TOE

Important for me Less important

Transesophageal echocardiography provides superior views of the atrial septum and therefore is preferred to transthoracic echocardiography for detecting patent foramen ovale

Where is B-type natriuretic peptide mainly secreted from?

- ☐ Atrial myocardium
- ☐ Juxtaglomerular cells
- ☐ Zona glomerulosa
- ☐ Ventricular myocardium
- ☐ Hypothalamus

Atrial myocardium

17%

Juxtaglomerular cells

4%

Zona glomerulosa

2%

Ventricular myocardium

75%

Hypothalamus

3%

B-type natriuretic peptide is mainly secreted by the ventricular myocardium

Important for me

Less important

A 72-year-old female is admitted for an elective abdominal aortic aneurysm repair. She has a past medical history of long-standing asthma and an undiagnosed peripheral neuropathy. On day 4 post-op, she develops a net-like rash over her torso with fevers, myalgias and discolouration of her toes.

Blood tests reveal:

Hb	128 g/l
Platelets	$240 \times 10^9/l$
WBC	$12.2 \times 10^9/l$
Eosinophils	$2.3 \times 10^9/l$
Na ⁺	138 mmol/l
K ⁺	4.1 mmol/l
Urea	8.8 mmol/l
Creatinine	176 μ mol/l

What is the most likely diagnosis?

- ☒ DRESS syndrome
- ☐ Cholesterol emboli
- ☐ Churg-Strauss

DRESS syndrome	12%
Cholesterol emboli	66%
Churg-Strauss	12%
Chronic eosinophilic syndrome	5%
Arterial thromboembolism	5%

The answer is cholesterol emboli which presents after a precipitating event such as angiography or abdominal aortic aneurysm repair. Clinical features include livedo reticularis, eosinophilia, purpura, and renal failure.

Churg-Strauss would be associated with late-onset asthma, chronic eosinophilic syndrome is a diagnosis of exclusion and is a more long-term event, and arterial thromboembolism would not be associated with eosinophilia. DRESS syndrome would be associated with a drug precipitant which is not mentioned in the question.

Which one of the following statements regarding warfarin is correct?

- ☐ Warfarin can be used when breast-feeding
- ☐ Hypothyroidism may develop in a small minority of patients
- ☐ Aortic prosthetic valves generally require a higher INR than mitral valves
- ☐ The target INR following a pulmonary embolism is 3.5
- ☐ All patients with an INR of greater than 6.0 should be given vitamin K

Warfarin can be used when breast-feeding

45%

Hypothyroidism may develop in a small minority of patients

13%

Aortic prosthetic valves generally require a higher INR than mitral valves

14%

The target INR following a pulmonary embolism is 3.5

8%

All patients with an INR of greater than 6.0 should be given vitamin K

20%

A patient with known heart failure has slight limitation of physical activity. She is comfortable at rest but ordinary activities such as walking to the local shops results in fatigue, palpitations or dyspnoea. What New York Heart Association class best describes the severity of their disease?

- ☐ NYHA Class 0
- ☐ NYHA Class I
- ☐ NYHA Class II
- ☐ NYHA Class III
- ☐ NYHA Class IV

NYHA Class 0

2%

NYHA Class I

15%

NYHA Class II

57%

NYHA Class III

24%

NYHA Class IV

2%

A 65-year-old man is found to have an ejection systolic murmur and narrow pulse pressure on examination. He has experienced no chest pain, breathlessness or syncope. An echo confirms aortic stenosis and shows an aortic valve gradient of 36 mmHg. How should this patient be managed?

- ☐ Routine aortic valve replacement
- ☐ Urgent aortic valve replacement
- ☐ Anticoagulation
- ☐ Aortic valvuloplasty
- ☐ Regular cardiology outpatient review

Routine aortic valve replacement	15%
Urgent aortic valve replacement	8%
Anticoagulation	4%
Aortic valvuloplasty	9%
Regular cardiology outpatient review	64%

Aortic stenosis management: AVR if symptomatic, otherwise cut-off is gradient of 40 mmHg

Important for me Less important

No action should be taken at present as he is currently asymptomatic. If the aortic valve gradient > 40 mmHg or there is evidence of significant left ventricular dysfunction then surgery is sometimes considered in selected asymptomatic patients

You get bleeped in the middle of your night shift to talk to a worried father who's daughter has been admitted with cyanosis. He tells you that they were aware she has had a murmur since birth, but it has only been the last few days in which she has had symptoms. You believe that this is a case of Eisenmenger's syndrome.

What is the medical definition of Eisenmenger's syndrome?

- ☐ The reversal of a right-to-left shunt
- ☐ An audible ventricular septal defect
- ☐ Presence of a ventricular septal defect alongside an atrial septal defect
- ☐ The reversal of a left-to-right shunt
- ☐ All four of the following: overriding aorta, pulmonary stenosis, right ventricular hypertrophy, ventricular septal defect

The reversal of a right-to-left shunt

19%

An audible ventricular septal defect

3%

Presence of a ventricular septal defect alongside an atrial septal defect

4%

The reversal of a left-to-right shunt

69%

All four of the following: overriding aorta, pulmonary stenosis, right ventricular hypertrophy, ventricular septal defect

5%

Eisenmenger's syndrome - the reversal of a left-to-right shunt

Important for me Less important

Eisenmenger's syndrome is the reversal of left-to-right shunt associated with ventricular septal defects, atrial septal defect and a patent ductus arteriosus.

Your review a 41-year-old woman. Four months ago she developed a deep vein thrombosis and was warfarinised with a target INR of 2.5. She has presented with a swollen, tender left calf and a Doppler scan confirms a further deep vein thrombosis. Her INR has been above 2.0 for the past three months. You organise some investigations to exclude an underlying prothrombotic condition. What should happen regarding her anticoagulation?

- ☐ Switch to treatment dose low-molecular weight heparin
- ☐ Continue on warfarin, continue with INR target of 2.5
- ☐ Add aspirin 75 mg od
- ☐ Continue on warfarin, increase INR target to 3.0
- ☐ Continue on warfarin, increase INR target to 3.5

Switch to treatment dose low-molecular weight heparin

16%

Continue on warfarin, continue with INR target of 2.5

10%

Add aspirin 75 mg od

3%

Continue on warfarin, increase INR target to 3.0

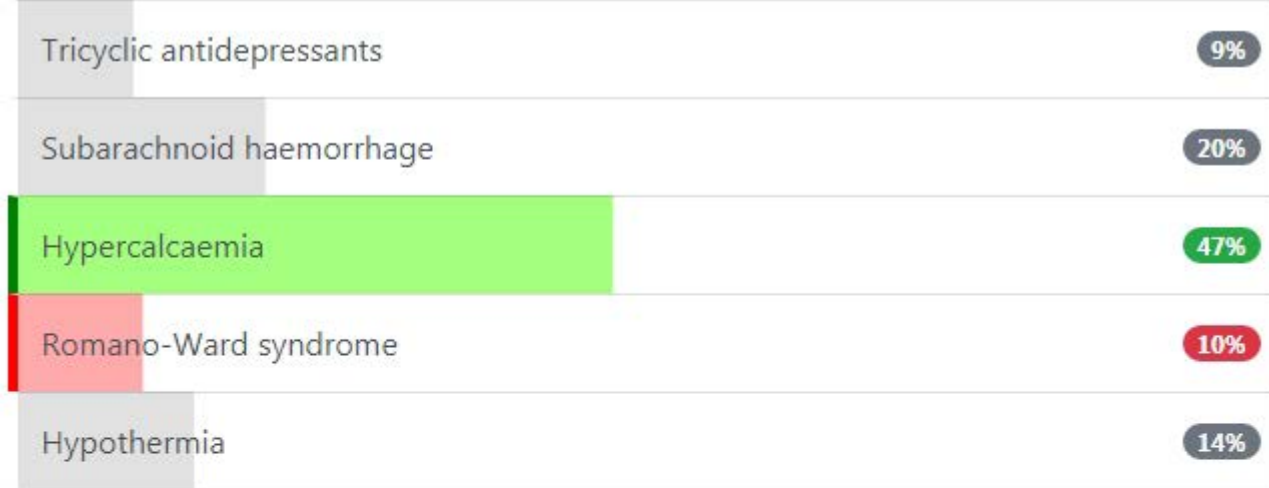
28%

Continue on warfarin, increase INR target to 3.5

43%

A 34-year-old woman is admitted to the Emergency Department following a collapse. An ECG shows a polymorphic ventricular tachycardia. Which one of the following is not associated with an increased risk of developing torsade de pointes?

- ☐ Tricyclic antidepressants
- ☐ Subarachnoid haemorrhage
- ☐ Hypercalcaemia
- ☐ Romano-Ward syndrome
- ☐ Hypothermia



Hypocalcemia is associated with QT interval prolongation; Hypercalcemia is associated with QT interval shortening

Important for me Less important

Hypocalcaemia, not hypercalcaemia, causes prolongation of the QT interval and hence may predispose to the development of torsade de pointes

Which one of the following features is not part of the modified Duke criteria used in the diagnosis of infective endocarditis?

- ☐ Fever $> 38^{\circ}\text{C}$
- ☐ Positive molecular assays for specific gene targets
- ☐ Indwelling central line
- ☐ Intravenous drug use
- ☐ Janeway lesions



The modified Duke criteria have now been adopted in the latest guidelines from the European Society of Cardiology. Details can be found in the link below

A 71-year-old woman is reviewed in the falls clinic. Her blood pressure is 146/ 94 mmHg. This is confirmed on a second reading. In line with recent NICE guidance, what is the most appropriate next-step?

- ☐ Ask her to come back in 6 months for a blood pressure check
- ☐ Arrange 3 blood pressure checks with the practice nurse over the next 2 weeks with medical review following
- ☐ Arrange ambulatory blood pressure monitoring
- ☐ Reassure her this is acceptable for her age
- ☐ Start treatment with a calcium channel blocker

Ask her to come back in 6 months for a blood pressure check

2%

Arrange 3 blood pressure checks with the practice nurse over the next 2 weeks with medical review following

9%

Arrange ambulatory blood pressure monitoring

54%

Reassure her this is acceptable for her age

6%

Start treatment with a calcium channel blocker

29%

Hypertension - NICE now recommend ambulatory blood pressure monitoring to aid diagnosis

Important for me Less important

The 2011 NICE guidelines recognise that in the past there was overtreatment of 'white coat' hypertension. The use of ambulatory blood pressure monitoring (ABPM) aims to reduce this. There is also good evidence that ABPM is a better predictor of cardiovascular risk than clinic blood pressure readings. See the following study for more details:

Verdecchia P. Prognostic value of ambulatory blood pressure: current evidence and clinical implications. Hypertension 2000; 35: 844-851

Dr Assem

A 75-year-old woman is brought to the Emergency Department by her family. She has been getting more short-of-breath over the last 6 weeks and says her energy levels are low. An ECG on arrival shows atrial fibrillation at a rate of 114 / min. Blood pressure is 128/80 mmHg and a chest x-ray is unremarkable. What is the appropriate drug to control the heart rate?

☐ Felodipine

☐ Amiodarone

☐ Digoxin

☐ Flecainide

☐ Bisoprolol



Atrial fibrillation: rate control - beta blockers preferable to digoxin

Important for me Less important

This question reiterates an important point which frequently comes up in exams - digoxin is no longer first-line for rate control in atrial fibrillation. Her shortness-of-breath is likely to be rate related and does not necessarily mean that she is in heart failure. This is supported by a normal chest x-ray.

Please see the NICE guidelines for further information.

A 36-year-old man has presented to the emergency department with palpitations. His heart rate was 138 beats per minute and an ECG showed a likely supraventricular tachycardia. The registrar asks you to draw up 6mg of adenosine.

Which of the following drugs may reduce the action of adenosine?

- ☐ Dipyridamole
- ☐ Bupivacaine
- ☐ Aminophylline
- ☐ Amiodarone
- ☐ Montelukast

Dipyridamole

19%

Bupivacaine

4%

Aminophylline

59%

Amiodarone

9%

Montelukast

9%

Aminophylline reduces the effect of adenosine

Important for me Less important

The answer is aminophylline. dipyridamole classically *enhances* the action. This is commonly remembered with the mnemonic DEAR. Bupivacaine (and other -caines) all also enhance the action of adenosine.

Amiodarone and montelukast are distractors, that have no notable effect.

Dr Assem

You are called to review a 78-year-old man on the surgical wards. He is three days post-op following a colectomy. He was recently diagnosed with colon cancer (Duke's C) and has a history of polymyalgia rheumatica. Current medications include co-codamol 30/500, prednisolone and prophylactic dose low-molecular weight heparin. Five minutes ago he started to complain of severe central chest pain. An ECG performed by the nurses shows ST elevation in the anterior leads. Aspirin and oxygen have been given by the Foundation 1 doctor. What is the most appropriate treatment?

- ☐ IV diamorphine + increase low-molecular weight heparin to treatment dose + double his prednisolone dose
- ☐ IV diamorphine + arrange echocardiogram urgently to exclude pericardial tamponade
- ☐ IV diamorphine + call the family in to discuss withdrawal of treatment
- ☐ IV diamorphine + arrange percutaneous coronary intervention
- ☐ IV diamorphine + thrombolysis

IV diamorphine + increase low-molecular weight heparin to treatment dose + double his prednisolone dose

8%

IV diamorphine + arrange echocardiogram urgently to exclude pericardial tamponade

6%

IV diamorphine + call the family in to discuss withdrawal of treatment

3%

IV diamorphine + arrange percutaneous coronary intervention

76%

IV diamorphine + thrombolysis

8%

Primary percutaneous coronary intervention is the most appropriate treatment given his recent operation and associated risk of bleeding.

A 60-year-old man is admitted with severe central chest pain to the resus department. The admission ECG shows ST elevation in leads V1-V4 with reciprocal changes in the inferior leads. Which one of the following is most likely to account for these findings?

- ☐ 75% occlusion of the left anterior descending artery
- ☐ 75% occlusion of the left circumflex artery
- ☐ 75% occlusion of the right coronary artery
- ☐ 100% occlusion of the left circumflex artery
- ☐ 100% occlusion of the left anterior descending artery

75% occlusion of the left anterior descending artery	25%
75% occlusion of the left circumflex artery	5%
75% occlusion of the right coronary artery	10%
100% occlusion of the left circumflex artery	5%
100% occlusion of the left anterior descending artery	56%

Widespread ST elevation in this territory implies a complete occlusion of the left anterior descending artery.

A 58-year-old man is admitted to the cardiology ward after presenting with fever, malaise and a new murmur. An echocardiogram has shown a vegetation on the aortic valve. Blood cultures are reported as follows:

Streptococcus sanguinis isolated

What is the most appropriate follow-up given the blood culture results?

- ☐ Colonoscopy
- ☐ HIV test
- ☐ Dental review
- ☐ High resolution CT of the chest
- ☐ Complement levels

Colonoscopy

19%

HIV test

13%

Dental review

55%

High resolution CT of the chest

6%

Complement levels

8%

Patients with very poor dental hygiene - Viridans streptococci e.g. *Streptococcus sanguinis*

Important for me Less important

Streptococcus sanguinis is one of the viridans group streptococci, or α -hemolytic streptococci, which are common causes of infective endocarditis. They are commensal in the mouth and invasive infection is associated with dental disease. The American Heart Association recommend:

'A thorough dental evaluation should be obtained and all active sources of oral infection should be eradicated.'

Dr Assem

A 79-year-old woman is reviewed. She has taken bendroflumethiazide 2.5mg od for the past 10 years for hypertension. Her current blood pressure is 150/94 mmHg. Clinical examination is otherwise unremarkable. An echocardiogram from two months ago is reported as follows:

Ejection fraction 48%, moderate left ventricular hypertrophy. Minimal MR noted

What is the most appropriate next step in management?

- ☐ Increase bendroflumethiazide to 5mg od
- ☐ Stop bendroflumethiazide + start frusemide 40mg od
- ☐ Add ramipril 1.25mg od
- ☐ Stop bendroflumethiazide + start ramipril 1.25mg od
- ☐ Add amlodipine 5mg od

Increase bendroflumethiazide to 5mg od	6%
Stop bendroflumethiazide + start frusemide 40mg od	4%
Add ramipril 1.25mg od	56%
Stop bendroflumethiazide + start ramipril 1.25mg od	8%
Add amlodipine 5mg od	26%

The echocardiogram shows a degree of left ventricular impairment. It is important an ACE inhibitor is started in such patients. This will help to both control her blood pressure and also slow the deterioration in her cardiac function.

Even though bendroflumethiazide is no longer the recommended thiazide of choice, and thiazides now come 'third' in the A + C + D guidelines, NICE do not recommend stopping treatment in patients who are already taking the drug.

A beta-blocker should also be added in the near future given the left ventricular impairment.

Each one of the following may cause secondary hypertension, except:

- ☐ Patent ductus arteriosus
- ☐ Cushing's syndrome
- ☐ Liddle's syndrome
- ☐ 11-beta hydroxylase deficiency
- ☐ Combined oral contraceptive pill

Each one of the following may cause secondary hypertension, except:

Patent ductus arteriosus	53%
Cushing's syndrome	4%
Liddle's syndrome	13%
11-beta hydroxylase deficiency	18%
Combined oral contraceptive pill	11%

A 54-year-old man is admitted to the Emergency Department (ED) after collapsing shortly after complaining of palpitations. On arrival in the ED he is found to be in ventricular tachycardia and is successfully cardioverted. Later investigations show that he has an underlying long QT syndrome. A implantable cardioverter-defibrillator (ICD) is inserted. He works as a heavy goods vehicle (HGV) driver. What is the most appropriate advice with regards to driving HGV vehicles?

- ☐ Permanent bar
- ☐ Cannot drive for 12 months
- ☐ Cannot drive for 6 months
- ☐ Cannot drive for 4 weeks
- ☐ Can drive straightaway

Permanent bar

47%

Cannot drive for 12 months

5%

Cannot drive for 6 months

22%

Cannot drive for 4 weeks

21%

Can drive straightaway

5%

ICD means loss of HGV licence, regardless of the circumstances

Important for me

Less important

A 44-year-old man is seen in the cardiology clinic. For the past 6 months he has been experiencing episodes of palpitations associated with pre-syncopal symptoms. An ECG taken in clinic shows T wave inversion in leads V1-3 associated with a notch at the end of the QRS complex. He is known to have a family history of sudden cardiac death. What is the most likely diagnosis?

- ☐ Arrhythmogenic right ventricular cardiomyopathy
- ☐ Catecholaminergic polymorphic ventricular tachycardia
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Long QT syndrome
- ☐ Brugada syndrome

Arrhythmogenic right ventricular cardiomyopathy

40%

Catecholaminergic polymorphic ventricular tachycardia

6%

Hypertrophic obstructive cardiomyopathy

17%

Long QT syndrome

3%

Brugada syndrome

33%

The notch at the end of the QRS complex is referred to as an epsilon wave.

Dr Assem

A 34-year-old woman attends a routine antenatal clinic at 16 weeks gestation. She has no significant past medical history but suffers with occasional frontal headaches.

She is noted to have a blood pressure of 148/76mmHg.

Urinalysis reveals;

pH	6.5
Protein	+1
Nitrates	0
Leuc	0
Blood	0

What is the most likely diagnosis?

- ☐ Gestational hypertension
- ☐ Pre-eclampsia
- ☐ HELLP
- ☐ Nephrotic syndrome
- ☐ Chronic hypertension

Gestational hypertension	16%
Pre-eclampsia	16%
HELLP	3%
Nephrotic syndrome	6%
Chronic hypertension	60%

The answer here is chronic hypertension.

At 16 weeks gestation, this lady is too early into her pregnancy to have developed any of the pregnancy related causes of hypertension. The small amount of protein in her urine may also indicate relatively long standing hypertension. Intermittent frontal headaches are a common occurrence and are not a sign of pre-eclampsia in this case.

Pre-eclampsia and gestational hypertension would only occur after 20 weeks gestation. Pre-eclampsia with significant proteinuria, gestational hypertension without.

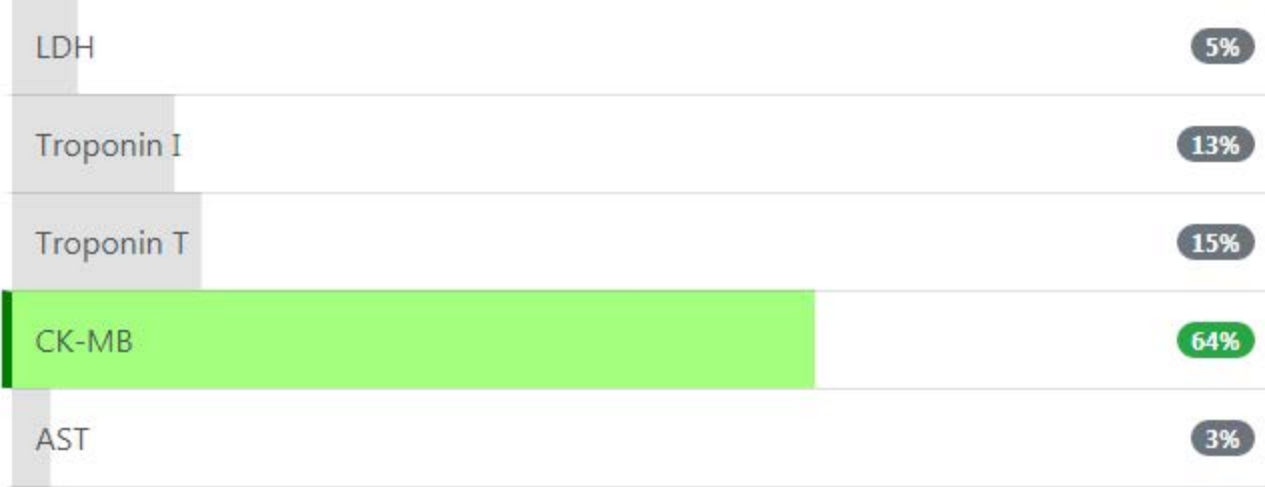
Nephrotic syndrome would be associated with a larger degree of proteinuria.

For further information on hypertension in pregnancy:

<https://www.nice.org.uk/guidance/cg107/chapter/guidance>

A 62-year-old man is admitted to hospital following a myocardial infarction. Four days after admission he develops a further episode of central crushing chest pain. Which is the best cardiac marker to investigate his chest pain?

- ☐ LDH
- ☐ Troponin I
- ☐ Troponin T
- ☐ CK-MB
- ☐ AST



By day four the CK-MB levels should have returned to normal from the initial myocardial infarction. If the CK-MB levels are elevated it would indicate a further coronary event

A 76-year-old woman is admitted to the resus department after collapsing whilst shopping. The paramedics report she is hypotensive and tachycardia. Initial observations include a heart rate of 160 bpm and a blood pressure of 98 / 60 mmHg. A 12 lead ECG shows a broad complex tachycardia. Which one of the following features on the ECG would suggest a ventricular tachycardia rather than a supraventricular tachycardia with aberrant conduction?

- ☐ QRS < 160 ms
- ☐ A corrected QT interval of 420ms
- ☐ Atrioventricular dissociation
- ☐ Marked right axis deviation
- ☐ Heart rate of 160 bpm

QRS < 160 ms

10%

A corrected QT interval of 420ms

11%

Atrioventricular dissociation

64%

Marked right axis deviation

11%

Heart rate of 160 bpm

5%

A 26-year-old female is admitted to hospital with palpitations. ECG shows a shortened PR interval and wide QRS complexes associated with a slurred upstroke seen in lead II. What is the definitive management of this condition?

- ☐ Accessory pathway ablation
- ☐ Lifelong aspirin
- ☐ AV node ablation
- ☐ Lifelong amiodarone
- ☐ Permanent pacemaker

Accessory pathway ablation

81%

Lifelong aspirin

2%

AV node ablation

7%

Lifelong amiodarone

4%

Permanent pacemaker

6%

This patient has Wolff-Parkinson White syndrome, with accessory pathway ablation being the definitive treatment.

A 68-year-old man with a past history of aortic stenosis is reviewed in clinic. Which one of the following features would most guide the timing of surgery?

- ☐ Symptomatology of patient
- ☐ Aortic valve gradient of 36 mmHg
- ☐ Pulse pressure
- ☐ Loudness of murmur
- ☐ Left ventricular ejection fraction

Symptomatology of patient

71%

Aortic valve gradient of 36 mmHg

9%

Pulse pressure

3%

Loudness of murmur

4%

Left ventricular ejection fraction

13%

Aortic stenosis management: AVR if symptomatic, otherwise cut-off is gradient of 40 mmHg

Important for me Less important

A 42-year-old man has his blood pressure measured as part of a routine medical exam. His blood pressure is recorded as 155/95 mmHg. This is unexpected as it has been normal for the past 5 annual medical exams.

Which one of the following factors may account for this finding?

- ☐ Elevation of the measured arm above heart level
- ☐ The measured arm being supported during the reading
- ☐ The patient lying on an examination couch during the reading
- ☐ The patient talking during the reading
- ☐ An undersized blood pressure cuff

Elevation of the measured arm above heart level

11%

The measured arm being supported during the reading

3%

The patient lying on an examination couch during the reading

5%

The patient talking during the reading

14%

An undersized blood pressure cuff

68%

An undersized blood pressure cuff may lead to an overestimation of blood pressure

Important for me Less important

Dr. Assem

A 52-year-old man with a history of hypertension is found to have a 10-year cardiovascular disease risk of 28%. A decision is made to start atorvastatin 20mg on. Liver function tests are performed prior to initialising treatment:

Bilirubin	10 $\mu\text{mol/l}$ (3 - 17 $\mu\text{mol/l}$)
ALP	96 u/l (30 - 150 u/l)
ALT	30 u/l (10 - 45 u/l)
Gamma-GT	28 u/l (10 - 40 u/l)

Three months later the LFTs are repeated:

Bilirubin	12 $\mu\text{mol/l}$ (3 - 17 $\mu\text{mol/l}$)
ALP	107 u/l (30 - 150 u/l)
ALT	104 u/l (10 - 45 u/l)
Gamma-GT	76 u/l (10 - 40 u/l)

What is the most appropriate course of action?

- ☐ Continue treatment and repeat LFTs in 1 month
- ☐ Check creatine kinase
- ☐ Reduce dose to atorvastatin 10mg on and repeat LFTs in 1 month

Continue treatment and repeat LFTs in 1 month

48%

Check creatine kinase

6%

Reduce dose to atorvastatin 10mg on and repeat LFTs in 1 month

14%

Stop treatment and consider alternative lipid lowering drug

30%

Stop treatment and refer to gastroenterology

3%

Treatment with statins should be discontinued if serum transaminase concentrations rise to and persist at 3 times the upper limit of the reference range.

A 72-year-old man who is known to have chronic kidney disease stage 4 is admitted to the Emergency Department. Since yesterday he has felt short-of-breath on exertion and has been coughing up blood. On examination he tachycardic at 110/min with a normal chest examination. What is the most suitable initial imaging investigation to exclude a pulmonary embolism?

- ☐ Ventilation-perfusion scan
- ☐ Computed tomographic pulmonary angiography
- ☐ Pulmonary angiography
- ☐ MRI thorax
- ☐ Echocardiogram

Ventilation-perfusion scan

56%

Computed tomographic pulmonary angiography

35%

Pulmonary angiography

3%

MRI thorax

2%

Echocardiogram

4%

Pulmonary embolism and renal impairment → V/Q scan is the investigation of choice

Important for me Less important

Computed tomographic pulmonary angiography (CTPA) is now used first-line to investigate the possibility of pulmonary embolism. Patients with renal impairment however should be offered Ventilation-perfusion (V/Q) scans as the contrast media used during CTPAs is nephrotoxic.

A 79-year-old man is referred to the acute medical unit following a fall. He is unsure why he collapsed but is now fully alert. He is complaining of abdominal pain but his bowel habits are unchanged.

He has a past medical history of prostatism and hypertension. He tells you he doesn't take any medication.

On examination he has a Glasgow coma scale score of 15, a blood pressure of 98/46 mmHg and a heart rate of 98beats per minute.

Hb	115 g/l
Platelets	$321 \times 10^9/l$
WBC	$6.6 \times 10^9/l$

His radiology results are reported as follows:

Chest	PA film, lung fields clear, widened mediastinum
Abdomen	normal bowel gas pattern

Which of the following is the next most appropriate step in this man's management?

- ☐ Urgent echocardiogram
- ☐ CT aortic angiogram

Urgent echocardiogram	17%
CT aortic angiogram	67%
Start IV labetalol	11%
Bronchoscopy with pleural biopsy	2%
Pericardiocentesis	3%

In a man with low blood pressure and vague abdominal pain, always be mindful of the possibility of dissection or aneurysmal rupture. CT imaging with arterial contrast is the gold standard for diagnosis. Whilst an echocardiogram might identify disruption of the aortic root in a backwards tear, it would not identify more distal aortic pathology.

A 60-year-old man is admitted with palpitations to the Emergency Department. An ECG on admission shows a broad complex tachycardia at a rate of 150 bpm. His blood pressure is 124/82 mmHg and there is no evidence of heart failure. Which one of the following is it least appropriate to give?

- ☐ Procainamide
- ☐ Lidocaine
- ☐ Synchronised DC shock
- ☐ Adenosine
- ☐ Verapamil



Ventricular tachycardia - verapamil is contraindicated

Important for me Less important

Verapamil should never be given to a patient with a broad complex tachycardia as it may precipitate ventricular fibrillation in patients with ventricular tachycardia. Adenosine is sometimes given in this situation as a 'trial' if there is a strong suspicion the underlying rhythm is a supraventricular tachycardia with aberrant conduction

Dr. Assem

Which of the following conditions is not associated with the development of aortic regurgitation?

- ☐ Rheumatic fever
- ☐ Ankylosing spondylitis
- ☐ Marfan's syndrome
- ☐ Syphilis
- ☐ Dilated cardiomyopathy



Dilated cardiomyopathy is associated with the development of mitral regurgitation, not aortic regurgitation

Which one of the following cardiac conditions is most associated with a louder murmur following the Valsalva manoeuvre?

- ☐ Mitral stenosis
- ☐ Aortic stenosis
- ☐ Ventricular septal defect
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Aortic regurgitation

Mitral stenosis

12%

Aortic stenosis

12%

Ventricular septal defect

10%

Hypertrophic obstructive cardiomyopathy

53%

Aortic regurgitation

14%

A 65-year-old man admitted to the Acute Medical Unit is noted to have cannon 'a' waves of his jugular venous pressure during cardiovascular examination. Which one of the following would not cause this finding?

- ☐ Tricuspid stenosis
- ☐ Complete heart block
- ☐ Ventricular tachycardia
- ☐ Single chamber ventricular pacing
- ☐ Nodal rhythm



Whilst tricuspid stenosis may cause large 'a' waves it does not cause cannon 'a' waves

A 72-year-old man is admitted to the Emergency Department with chest pain. On initial assessment he is noted to be pale, have a heart rate of 40/min and a blood pressure of 90/60 mmHg. Which one of the coronary arteries is most likely to be affected?

- ☐ Posterior descending
- ☐ Left anterior descending
- ☐ Right coronary
- ☐ Anterior interventricular
- ☐ Left circumflex



Complete heart block following a MI? - right coronary artery lesion

Important for me [Less important](#)

This patient has developed complete heart block secondary to a right coronary artery (RCA) infarction. The atrioventricular node is supplied by the posterior interventricular artery, which in the majority of patients is a branch of the right coronary artery. In the remainder of patients the posterior interventricular artery is supplied by the left circumflex artery.

Which one of the following is least likely to cause dilated cardiomyopathy?

- ☐ Wilson's disease
- ☐ Haemochromatosis
- ☐ Coxsackie B
- ☐ Hypertension
- ☐ Alcohol



Haemochromatosis is more commonly associated with restrictive cardiomyopathy but a dilated pattern may also be seen. There is a known association between Wilson's disease and cardiomyopathy but this is extremely rare and not often clinically significant

You are the ST1 working on cardiology. The nurses have asked you to review a 56-year-old man complaining of dyspnoea which is limiting his mobility.

He presented three days ago with an inferior STEMI. He was loaded with 300mg aspirin and 180mg ticagrelor before being taken to the cath-lab where he underwent primary PCI with a drug eluting stent for a sub-total occlusion of the right coronary artery. He was subsequently commenced on aspirin 100mg od, ticagrelor 90mg bd, atorvastatin 80mg od, bisoprolol 5mg od and perindopril 5mg od. His echo demonstrated only mildly reduced LV systolic function (LVEF 50%).

His vital signs are stable with a blood pressure 125/70mmHg, heart rate 64bpm, oxygen saturations 98% on room air and temperature 36.5°C. Examination reveals dual heart sounds with no murmurs and his chest is clear on auscultation with no wheeze. JVP is +2cm and there is no peripheral oedema. His calves are soft and non tender. A Chest X-Ray shows mild atelectasis at the bases. His bloods are unremarkable. His ecg shows normal sinus rhythm with inferior q waves.

With respect to his dyspnoea, what would be the next best step in his management?

- ☐ Cease bisoprolol
- ☐ Substitute ticagrelor for clopidogrel
- ☐ Order an urgent repeat echo
- ☐ Cease ticagrelor and continue aspirin only

Substitute ticagrelor for clopidogrel	35%
Order an urgent repeat echo	43%
Cease ticagrelor and continue aspirin only	6%
Start antibiotics for a nosocomial pneumonia	8%

Dyspnoea is a common side effect of ticagrelor and is estimated to occur in up to 15% of patients started on this medication. It is hypothesised that the sensation of dyspnoea in ticagrelor-treated patients is triggered by adenosine, because ticagrelor inhibits its clearance (by inhibiting the enzyme adenosine deaminase), thereby increasing its concentration in the circulation. It is important to be aware of this side effect in order to avoid unnecessary treatment and/or investigation, as it is easily remedied by switching the patient to clopidogrel.

With respect to the other options, in this scenario there are no clinical features to suggest intolerance to a beta-blocker or heart failure. There are also no clinical signs to suggest a hospital acquired pneumonia with basal atelectasis a not uncommon finding in previously ambient patients who are hospitalised. It is important to be aware of the possibility of acute mitral regurgitation or a ventral septal defect post STEMI as these require urgent diagnostic echo and surgical repair; however, given the fact that this patient is otherwise clinically well apart from subjective dyspnoea, has no murmurs on examination or signs of heart failure, this option is an unlikely cause of his dyspnoea. Whilst ticagrelor is associated with dyspnoea and cessation of this medication will most likely result in

to continue on single agent anti-platelet

A 70-year-old woman is brought to the Emergency Department by her relatives. For the past two hours she has experienced palpitations and 'tightness' in her chest. An ECG taken on arrival shows baseline atrial activity of around 300/min with a ventricular rate of 150/min. What is the most likely diagnosis?

- ☐ Atrioventricular nodal re-entry tachycardia (AVNRT)
- ☐ Atrial flutter
- ☐ Atrioventricular re-entry tachycardia (AVRT)
- ☐ Junctional tachycardia
- ☐ Atrial fibrillation

Atrioventricular nodal re-entry tachycardia (AVNRT)

16%

Atrial flutter

66%

Atrioventricular re-entry tachycardia (AVRT)

8%

Junctional tachycardia

3%

Atrial fibrillation

7%

Tachycardia with a rate of 150/min ?atrial flutter

Important for me

Less important

A 45-year-old man presents with fever. On examination he is noted to have a pan-systolic murmur and splinter haemorrhages. He is generally unwell with a blood pressure of 100/60 mmHg and a temperature of 38.8°C. What is the most suitable antibiotic therapy until blood culture results are known?

- ☐ IV amoxicillin + gentamicin
- ☐ IV benzylpenicillin + gentamicin
- ☐ IV vancomycin + gentamicin
- ☐ IV vancomycin + benzylpenicillin
- ☐ IV ceftriaxone + benzylpenicillin

IV amoxicillin + gentamicin

38%

IV benzylpenicillin + gentamicin

27%

IV vancomycin + gentamicin

18%

IV vancomycin + benzylpenicillin

10%

IV ceftriaxone + benzylpenicillin

6%

Dr. ASSU

A 54-year-old man is admitted to the Emergency Department with a 15 minute history of crushing central chest pain. Which one of the following rises first following a myocardial infarction?

- ☐ AST
- ☐ Troponin I
- ☐ CK
- ☐ CK-MB
- ☐ Myoglobin



Myoglobin rises first following a myocardial infarction

Important for me Less important

Dr. Assem

A 39-year-old male is diagnosed with pulmonary arterial hypertension. He was started on sildenafil four months ago after testing negative during vasodilator testing but has had a poor response to treatment with continued shortness of breath on exertion and peripheral oedema.

What additional medications should be considered to delay disease progression and ease symptoms?

- ☐ Diltiazem
- ☐ Isosorbide mononitrate
- ☐ Ambrisentan
- ☐ Nifedipine
- ☐ Furosemide

Diltiazem	8%
Isosorbide mononitrate	8%
Ambrisentan	55%
Nifedipine	18%
Furosemide	12%

Pulmonary arterial hypertension patients with negative response to vasodilator testing should be treated with prostacyclin analogues, endothelin receptor antagonists or phosphodiesterase inhibitors. Often combination therapy is required

Important for me Less important

The correct answer here is to combine sildenafil a phosphodiesterase inhibitor with an alternative medication used for treating patients who do not respond to acute vasodilator testing. These patients are candidates for treatment with prostacyclin analogues such as iloprost or epoprostenol, endothelin receptor antagonists such as bosentan or ambrisentan and phosphodiesterase inhibitors such as sildenafil. Studies suggest that the use of these medications can improve symptoms, delay disease progression and improve survival. As such the correct answer is to add in ambrisentan an endothelin receptor antagonist. As the popularity of combination therapy increases this is often being done at or soon after initiation of treatment.

A 79-year-old man is admitted with congestive cardiac failure. Bloods on admission show:

BNP	354 pg/ml
-----	-----------

Which one of the following would result from elevated BNP levels?

- ☐ Decreased sodium diuresis
- ☐ Vasoconstriction of the coronary arteries
- ☐ Inhibition of the renin-angiotensin-aldosterone system
- ☐ Vasoconstriction of the pulmonary vessels
- ☐ Increased sympathetic tone

Decreased sodium diuresis

11%

Vasoconstriction of the coronary arteries

11%

Inhibition of the renin-angiotensin-aldosterone system

56%

Vasoconstriction of the pulmonary vessels

8%

Increased sympathetic tone

14%

BNP - actions:

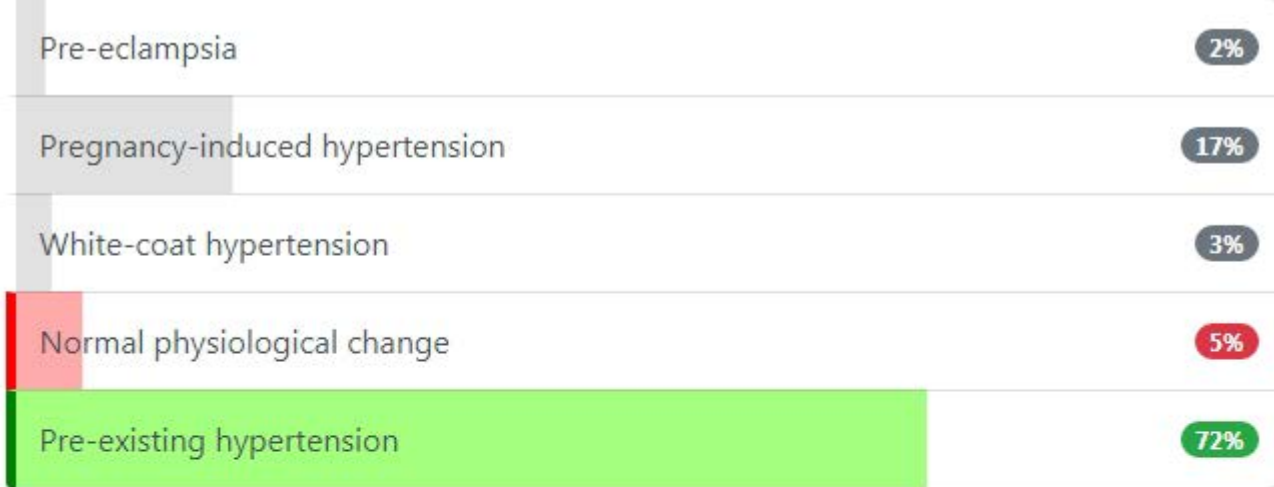
- vasodilator
- diuretic and natriuretic
- suppresses both sympathetic tone and the renin-angiotensin-aldosterone system

Important for me Less important

Dr. Arshem

A 36-year-old woman presents for a routine antenatal review. She is now 15 weeks pregnant. Her blood pressure in clinic is 154/94 mmHg. This is confirmed with ambulatory blood pressure monitoring. On reviewing the notes it appears her blood pressure four weeks ago was 146/88 mmHg. A urine dipstick shows is normal. There is no significant past medical history of note. What is the most likely diagnosis?

- ☐ Pre-eclampsia
- ☐ Pregnancy-induced hypertension
- ☐ White-coat hypertension
- ☐ Normal physiological change
- ☐ Pre-existing hypertension



This lady has pre-existing hypertension. Pregnancy-related blood pressure problems (such as pregnancy-induced hypertension or pre-eclampsia) do not occur before 20 weeks. The raised ambulatory blood pressure readings exclude a diagnosis of white-coat hypertension.

Note the use of the term 'pre-existing hypertension' rather than essential hypertension. Raised blood pressure in a 36-year-old female is not that common and raises the possibility of secondary hypertension.

A 43-year-old man who is known to have Wolff-Parkinson White syndrome presents to the Emergency Department with palpitations. He has no other significant history of note. The palpitations started around 4 hours ago and are not associated with chest pain or shortness of breath. On examination blood pressure is 124/80 mmHg and the chest is clear on auscultation. An ECG show atrial fibrillation at a rate of 154 bpm. Of the following options, what is the most appropriate management?

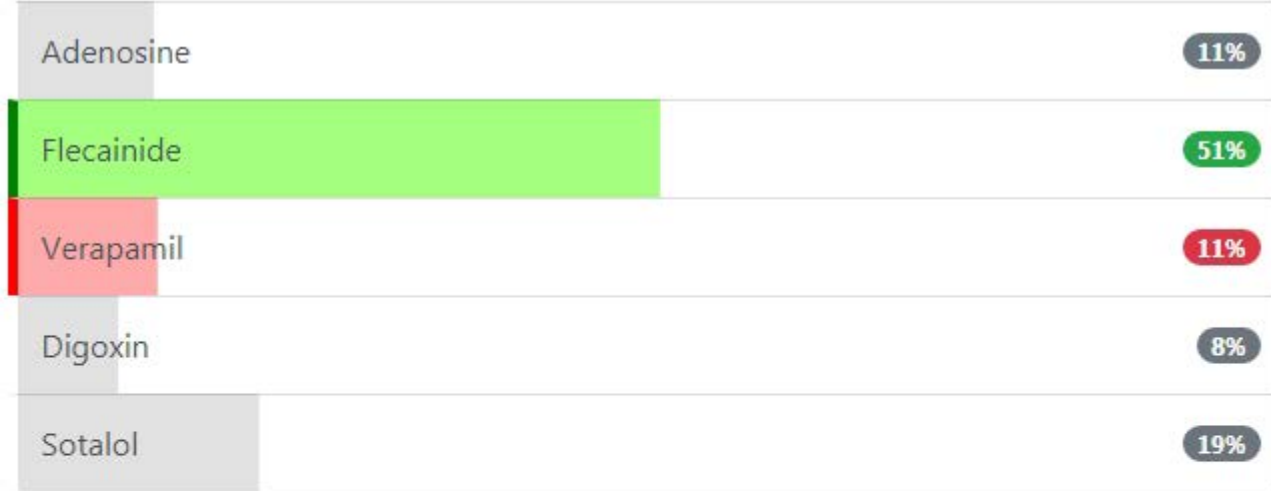
☐ Adenosine

☐ Flecainide

☐ Verapamil

☐ Digoxin

☐ Sotalol



Adenosine should be avoided as blocking the AV node can paradoxically increase ventricular rate resulting in fall in cardiac output. Verapamil and digoxin should also be avoided in patients with Wolff-Parkinson White as they may precipitate VT or VF.

Another option to consider in this situation would be DC cardioversion

A 72-year-old woman who takes bendroflumethiazide for hypertension is admitted to the Emergency Department. Admission bloods show the following:

Na ⁺	131 mmol/l
K ⁺	2.2 mmol/l
Urea	3.1 mmol/l
Creatinine	56 µmol/l
Glucose	4.3 mmol/l

Which one of the following ECG features is most likely to be seen?

- ☐ Short PR interval
- ☐ Short QT interval
- ☐ Flattened P waves
- ☐ J waves
- ☐ U waves



Hypokalaemia - U waves on ECG

Important for me Less important

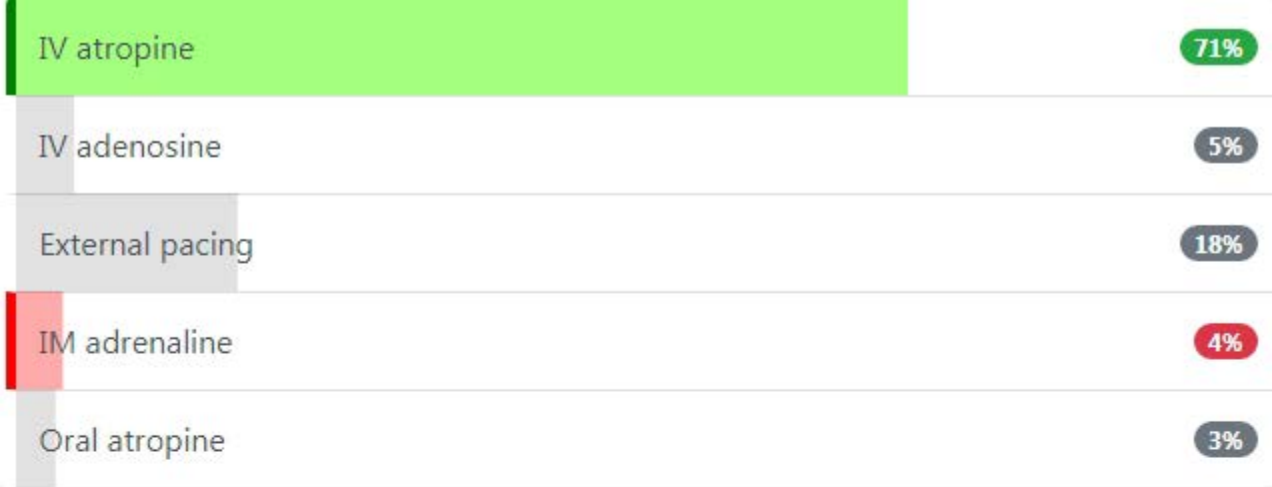
J waves are seen in hypothermia whilst delta waves are associated with Wolff Parkinson White syndrome.

A 56-year-old gentleman is brought in by paramedics. The patient fainted this morning and has not regained consciousness. No injuries reported from his faint. On examination his heart rate is 37 beats/minute, respiratory rate is 16 breaths/minute, blood pressure is 105/70 mmHg. You order an ECG:

The ECG shows prolonged PR interval.

What would be the initial management?

- ☐ IV atropine
- ☐ IV adenosine
- ☐ External pacing
- ☐ IM adrenaline
- ☐ Oral atropine



Symptomatic bradycardia is treated with atropine

Important for me Less important

This patient is suffering from bradycardia with adverse features (syncope) likely due to his first degree heart block (prolonged PR interval). Adverse features of bradycardia are shock, myocardial ischemia, heart failure and syncope. The initial treatment is IV atropine.

IV adenosine is not used in bradycardia, it is used in supraventricular tachycardias.

External pacing is only used if there is no improvement after six doses of atropine.

IM adrenaline is indicated for anaphylaxis

Oral atropine is only indicated for GI disorders caused by smooth muscle spasms.

A 71-year-old man is reviewed in the coronary care unit. He was admitted with an anterior ST-elevation myocardial infarction and received thrombolysis with alteplase. Ninety minutes following this an ECG shows a 30-40% resolution in the ST elevation. What is the most appropriate management?

- ☐ Percutaneous coronary intervention
- ☐ Repeat ECG in 4 hours, if still not a 50% resolution in ST elevation then proceed to percutaneous coronary intervention
- ☐ Repeat thrombolysis with alteplase
- ☐ Start a nitrate infusion
- ☐ Inform his relatives that further intervention is futile and ensure adequate pain relief

Percutaneous coronary intervention

67%

Repeat ECG in 4 hours, if still not a 50% resolution in ST elevation then proceed to percutaneous coronary intervention

22%

Repeat thrombolysis with alteplase

4%

Start a nitrate infusion

4%

Inform his relatives that further intervention is futile and ensure adequate pain relief

3%

What is the mechanism of action of nicorandil?

- ☐ Fast-sodium channel antagonist
- ☐ Nitric oxide reductase inhibitor
- ☐ Acts on the I_f ion current in the sinoatrial node
- ☐ Potassium-channel activator
- ☐ Glutathione S-transferase inhibitor

Fast-sodium channel antagonist

12%

Nitric oxide reductase inhibitor

30%

Acts on the I_f ion current in the sinoatrial node

16%

Potassium-channel activator

38%

Glutathione S-transferase inhibitor

3%

Dr. Assan

Which one of the following may reduce the effects of adenosine?

☐ Dipyridamole

☐ Diltiazem

☐ Clopidogrel

☐ Amiodarone

☐ Aminophylline

Dr Assem

Dipyridamole

22%

Diltiazem

5%

Clopidogrel

8%

Amiodarone

8%

Aminophylline

58%

Adenosine

- dipyridamole enhances effect
- aminophylline reduces effect

Important for me Less important

A middle-aged woman is admitted to the Emergency Department with pleuritic chest pain ten days after having a hysterectomy. There is a clinical suspicion of pulmonary embolism. What is the most common chest x-ray finding in patients with pulmonary embolism?

- ☐ Right heart enlargement
- ☐ Normal
- ☐ Pleural effusion
- ☐ Linear atelectasis
- ☐ Dilatation of the pulmonary vessels proximal to the embolism

Right heart enlargement

6%

Normal

75%

Pleural effusion

3%

Linear atelectasis

3%

Dilatation of the pulmonary vessels proximal to the embolism

12%

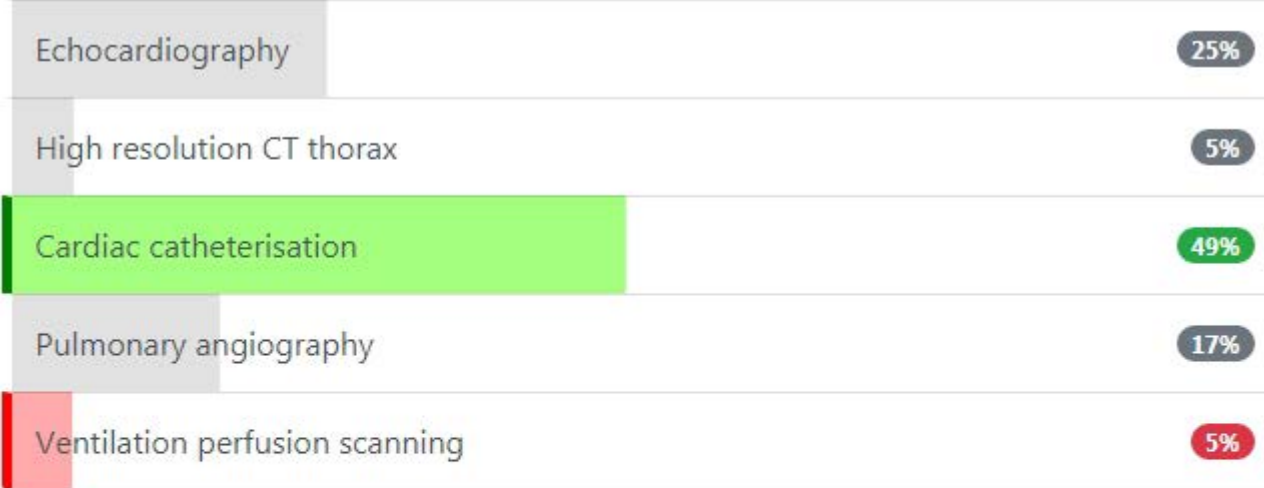
Pulmonary embolism - normal CXR

Important for me Less important

The vast majority of patients with a pulmonary embolism have a normal chest x-ray.

A 60-year-old man is investigated for progressive shortness of breath. On examination a loud P2 is noted associated with a left parasternal heave. An ECG shows evidence of right ventricular strain and a diagnosis of pulmonary hypertension is suspected. Which one of the following is the single most important test to confirm the diagnosis?

- ☐ Echocardiography
- ☐ High resolution CT thorax
- ☐ Cardiac catheterisation
- ☐ Pulmonary angiography
- ☐ Ventilation perfusion scanning



Whilst echocardiography may strongly point towards a diagnosis of pulmonary hypertension all patients need to have right heart pressures measured. Cardiac catheterisation is therefore the single most important investigation. Please see the British Thoracic Society guidelines for more details.

A 42-year-old man of Afro-Caribbean origin is diagnosed as having hypertension. Secondary causes of hypertension have been excluded. What is the most appropriate initial drug therapy?

- ☐ Losartan
- ☐ Bisoprolol
- ☐ Indapamide
- ☐ Ramipril
- ☐ Amlodipine



ACE inhibitors have reduced efficacy in black patients and are therefore not used first-line

Important for me Less important

A 76-year-old man with a history of ischaemic heart disease and hypertension presents for review. He had a myocardial infarction 20 years ago but has had no problems since. His current medication is clopidogrel, atorvastatin, ramipril and bisoprolol. He has recently been feeling light-headed and an ECG shows atrial fibrillation.

What antithrombotic medication should he now be taking?

- ☐ Continue clopidogrel monotherapy
- ☐ Switch to aspirin + clopidogrel
- ☐ Switch to an oral anticoagulant + clopidogrel
- ☐ Switch to an oral anticoagulant
- ☐ Switch to long-term low molecular weight heparin

Continue clopidogrel monotherapy

4%

Switch to aspirin + clopidogrel

7%

Switch to an oral anticoagulant + clopidogrel

32%

Switch to an oral anticoagulant

52%

Switch to long-term low molecular weight heparin

5%

Patients with *stable* CVD who have AF are generally managed on an anticoagulant and the antiplatelets stopped

Important for me Less important

This patient is at risk of stroke given his CHADS-VASC score (cardiovascular disease, hypertension, age etc). He, therefore, requires treatment. As his cardiovascular disease is stable, he should stop his antiplatelet and switch to oral anticoagulant monotherapy.

Where is the site of action of furosemide?

- ☐ Proximal collecting duct
- ☐ Ascending loop of Henle
- ☐ Descending loop of Henle
- ☐ Distal collecting duct
- ☐ Macula densa

Proximal collecting duct

4%

Ascending loop of Henle

79%

Descending loop of Henle

11%

Distal collecting duct

5%

Macula densa

1%

Furosemide - inhibits the Na-K-Cl cotransporter in the thick ascending limb of the loop of Henle

Important for me Less important

A 68-year-old man presents with a 4-day history of palpitations and increased breathlessness on exertion. An ECG shows atrial fibrillation with a rate of 118 beats per minute.

His past medical history includes brittle asthma, hypertension and congestive cardiac failure and his recent echocardiogram showed a left ventricular ejection fraction of 32%.

What is the most appropriate medication to control the heart rate in this man?

- ☐ Verapamil
- ☐ Sotalol
- ☐ Diltiazem
- ☐ Digoxin
- ☐ Amiodarone

Verapamil

16%

Sotalol

6%

Diltiazem

10%

Digoxin

57%

Amiodarone

11%

Rate-limiting CCBs should be avoided in patients with AF with heart failure with reduced EF (HFrEF) due to their negative inotropic effects

Important for me Less important

Rate-limiting calcium channel blockers (diltiazem and verapamil) should be avoided in patients with atrial fibrillation (AF) with heart failure with reduced ejection fraction (HFrEF) due to their negative inotropic effects.

Digoxin monotherapy is no longer considered first-line for rate control but may be preferred in patients with heart failure and a sedentary lifestyle.

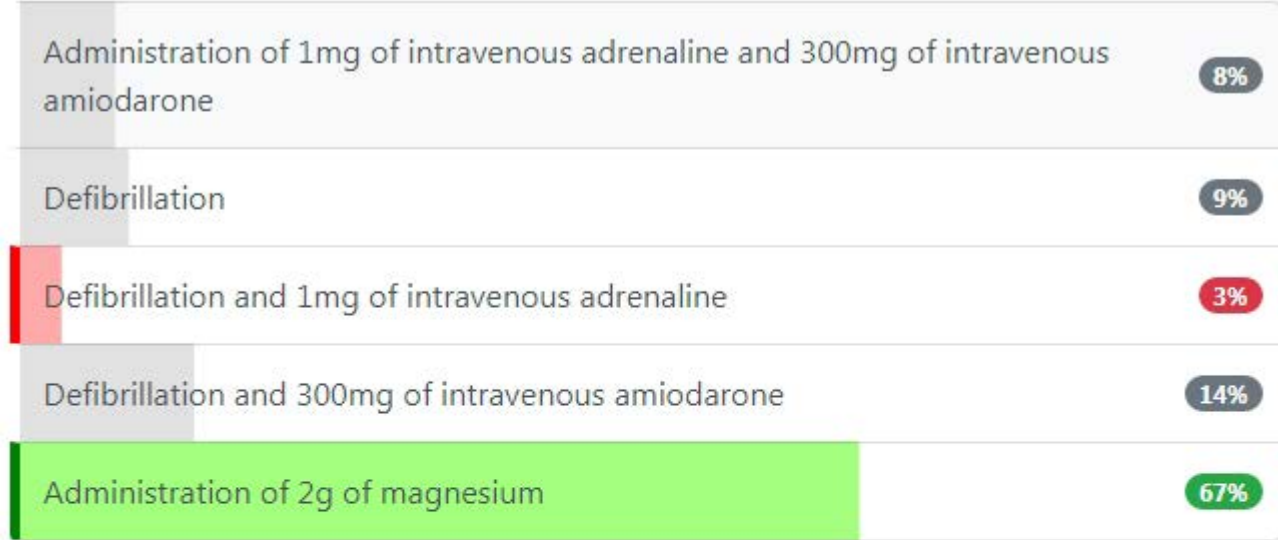
Sotalol and amiodarone are used to maintain sinus rhythm in AF.

Standard beta-blockers (not including sotalol) are commonly used for rate control in AF but they are not among the options and should be avoided in this patient with brittle asthma.

A 50-year-old man presents to the emergency department with heart palpitations. He is not experiencing chest pain. He has a long history of alcohol abuse. On examination there are no signs of shock, heart failure or syncope. He appears malnourished. An ECG shows an irregular tachycardia of 165 beats per minute with a QRS duration of 155ms. Laboratory results reveal a potassium of 2.1 mmol/l.

What should be the next step in management?

- ☐ Administration of 1mg of intravenous adrenaline and 300mg of intravenous amiodarone
- ☐ Defibrillation
- ☐ Defibrillation and 1mg of intravenous adrenaline
- ☐ Defibrillation and 300mg of intravenous amiodarone
- ☐ Administration of 2g of magnesium



The irregular tachycardia with a broad QRS complex is suggestive of either polymorphic ventricular tachycardia (VT), pre-excited atrial fibrillation, or atrial fibrillation with bundle branch block. The long history of alcohol abuse and the severe hypokalaemia make polymorphic ventricular tachycardia (Torsade de Pointes) the most likely diagnosis in this case. As per the Resuscitation Council tachycardia guidelines, as the patient has no adverse features, they should receive 2g of magnesium.

A 34-year-old man is noted to have a pan-systolic murmur associated with large V waves in the JVP and pulsatile hepatomegaly. Which one of the following types of congenital heart disease is most associated with tricuspid regurgitation?

- ☐ Atrial septal defect
- ☐ Ebstein's anomaly
- ☐ Coarctation of the aorta
- ☐ Patent ductus arteriosus
- ☐ Ventricular septal defect

Atrial septal defect

7%

Ebstein's anomaly

56%

Coarctation of the aorta

7%

Patent ductus arteriosus

8%

Ventricular septal defect

22%

A 45-year-old female develops pleuritic chest pain following a hysterectomy 10 days ago. Low-molecular weight heparin is given initially and CTPA confirms a pulmonary embolism. There is no previous history of venous thromboembolism. How long should the patient be warfarinised for?

- ☐ Not suitable for anticoagulation
- ☐ At least 4 weeks
- ☐ At least 3 months
- ☐ At least 6 months
- ☐ 12 months

Not suitable for anticoagulation

3%

At least 4 weeks

5%

At least 3 months

65%

At least 6 months

24%

12 months

3%

'Provoked' pulmonary embolisms are typically treated for 3 months

Important for me Less important

As this patient has a temporary risk factor for a thromboembolic event the recommended period of anticoagulation is 3 months.

How long should a patient stop driving for following an elective cardiac angioplasty?

☐ No restriction

☐ 1 week

☐ 2 weeks

☐ 4 weeks

☐ 8 weeks

Dr Assem

No restriction

13%

1 week

53%

2 weeks

7%

4 weeks

23%

8 weeks

4%

DVLA advice following angioplasty - cannot drive for 1 week

Important for me

Less important

Where is the most common site for primary cardiac tumours to occur in adults?

- ☐ Left atrium
- ☐ Right ventricle
- ☐ Right atrium
- ☐ Left atrial appendage
- ☐ Left ventricle



Atrial myxoma - commonest site = left atrium

Important for me [Less important](#)

The most common site of atrial myxomas is at the fossa ovalis border in the left atrium

Which one of the following statements regarding statin-induced myopathy is **incorrect**?

- ☐ Rhabdomyolysis may cause renal failure
- ☐ Patients with an elevated creatine kinase often have no symptoms
- ☐ Female sex is a risk factor
- ☐ Creatine kinase does not need to be routinely checked prior to commencing a statin
- ☐ Pravastatin is more likely to cause myopathy than simvastatin

Rhabdomyolysis may cause renal failure

3%

Patients with an elevated creatine kinase often have no symptoms

11%

Female sex is a risk factor

15%

Creatine kinase does not need to be routinely checked prior to commencing a statin

18%

Pravastatin is more likely to cause myopathy than simvastatin

53%

Myopathy is more common in lipophilic statins (simvastatin, atorvastatin) than relatively hydrophilic statins (rosuvastatin, pravastatin, fluvastatin)

A 38-year-old lady presents to the emergency department with increased shortness of breath for the last 5 days. On full history taking, you find she has also recently had some episodes of chest pain on exertion. She is normally fit and well but does report generalised aching and a high temperature approximately 2 weeks ago.

On examination you find that she is haemodynamically stable with a blood pressure on 100/65mmHg in the right arm and a heart rate of 95bpm. The radial pulse on the right side is absent. Heart sounds are normal and the apex beat is non displaced. Her oxygen saturations are 95% on air and her respiratory rate at rest is 20 breaths per minute.

Given the history and examination findings given, what is the most likely diagnosis?

What is the most likely diagnosis?

- ☐ Type B aortic dissection
- ☐ Acute myocarditis
- ☐ Community acquired pneumonia
- ☐ Takayasu's arteritis
- ☐ Peripheral arterial embolus

Acute myocarditis

11%

Community acquired pneumonia

2%

Takayasu's arteritis

68%

Peripheral arterial embolus

7%

The correct answer here is D: Takayasu's arteritis.

The key to this question is that all but this answer will give some features of history/examination mentioned but this is the only answer that explains all points.

Aortic dissection could have similar symptoms and if involving the subclavian could give an absent radial pulse, however a descending dissection (type B) would not normally do this. Community acquired pneumonia would explain the shortness of breath and perhaps chest pain secondary to pleurisy, but would not explain other findings. Acute myocarditis would explain shortness of breath and chest pain but not absent radial pulse. Whereas a peripheral arterial embolus would explain the absent radial pulse but not the other findings.

Takayasu's arteritis is therefore the only appropriate answer as it explains all findings.

Other causes of an absent radial pulse include: aortic dissection with subclavian involvement and peripheral arterial embolus (as mentioned above), trauma and iatrogenic

Where is the site of action of bendroflumethiazide?

- ☐ Proximal convoluted tubules
- ☐ Ascending loop of Henle
- ☐ Descending loop of Henle
- ☐ Proximal part of the distal convoluted tubules
- ☐ Distal part of the distal convoluted tubules

Proximal convoluted tubules

12%

Ascending loop of Henle

9%

Descending loop of Henle

5%

Proximal part of the distal convoluted tubules

59%

Distal part of the distal convoluted tubules

15%

Bendroflumethiazide - inhibits sodium reabsorption by blocking the $\text{Na}^+\text{-Cl}^-$ symporter at the beginning of the distal convoluted tubule

Important for me

Less important

A 52-year-old woman with a history of breast cancer is admitted with acute dyspnoea. Her respiratory rate on admission is 42 / min and her oxygen saturations are 87% on room air. A pulmonary embolism is suspected and she is transferred to the high dependency unit after being treated with oxygen and enoxaparin. Which one of the following would be strongest indication for thrombolysis?

- ☐ Extensive deep venous thrombosis
- ☐ Hypotension
- ☐ Patient choice following informed consent
- ☐ Hypoxaemia despite high flow oxygen
- ☐ ECG showing right ventricular strain

Extensive deep venous thrombosis

12%

Hypotension

46%

Patient choice following informed consent

10%

Hypoxaemia despite high flow oxygen

16%

ECG showing right ventricular strain

15%

Massive PE + hypotension - thrombolyse

Important for me Less important

A 75-year-old woman was admitted to the Acute Medical Unit with pneumonia. Her only past medical history of note is transient ischaemic attack 2 months previously. On initial assessment, ECG revealed atrial fibrillation with a ventricular rate of 103. She was treated with intravenous fluids and antibiotics. She improved significantly. Two further ECGs overnight revealed normal sinus rhythm. The following day, she was deemed medically fit for discharge.

What is the single most appropriate management option regarding her episode of atrial fibrillation?

- ☐ No follow-up required
- ☐ Repeat ECG in two weeks
- ☐ Oral anticoagulation
- ☐ Aspirin
- ☐ 24-hour tape and consider oral anticoagulation



A single episode of paroxysmal atrial fibrillation, even if provoked, should still prompt consideration of anticoagulation

Important for me Less important

This patient has a CHADSVASC score of three therefore initiating anticoagulation would be appropriate. Despite being provoked by pneumonia, this patient is at high risk of having further episodes of atrial fibrillation. Aspirin is no longer recommended. A 24-hour tape is useful in patients with symptomatic palpitations, or those who have experienced a thrombo-embolic event without known AF. In this example we have already 'found' atrial fibrillation, and we should initiate treatment. While some studies have linked paroxysmal AF 'burden' on cardiac monitoring to stroke risk, this is not currently in guidelines. We know from the CHADSVASC score that on average, the risk is likely to be high (approximately 3.2% per year) regardless of burden. A 24-hour tape may be useful when considering an ablation, or assessing the response to rhythm control medication. Repeating the ECG in two weeks is not an unreasonable suggestion, but should not preclude initiation of anticoagulation.

Each one of the following is an indication for an implantable cardiac defibrillator, except:

- ☐ Previous myocardial infarction with non-sustained VT on 24 hr monitoring
- ☐ Wolff-Parkinson White syndrome
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Previous cardiac arrest due to VF
- ☐ Long QT syndrome

Previous myocardial infarction with non-sustained VT on 24 hr monitoring

24%

Wolff-Parkinson White syndrome

44%

Hypertrophic obstructive cardiomyopathy

11%

Previous cardiac arrest due to VF

8%

Long QT syndrome

12%

A 52-year-old female with a known history of systemic sclerosis presents for annual review to the rheumatology clinic. Which one of the following symptoms is most characteristic in patients who have developed pulmonary arterial hypertension?

- ☐ Exertional dyspnoea
- ☐ Paroxysmal nocturnal dyspnoea
- ☐ Cough
- ☐ Early morning dyspnoea
- ☐ Orthopnoea

Exertional dyspnoea

76%

Paroxysmal nocturnal dyspnoea

8%

Cough

3%

Early morning dyspnoea

8%

Orthopnoea

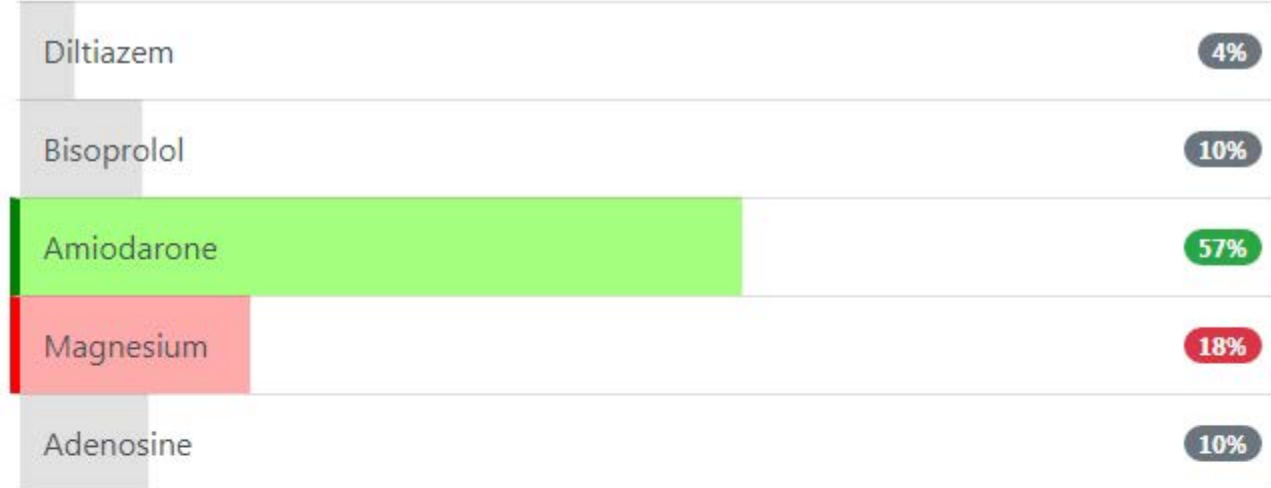
5%

Acute vasodilator testing should be used in patients with pulmonary artery hypertension to determine which patient show a significant fall in pulmonary arterial pressure following vasodilators and help guide treatment

Important for me Less important

A 28-year-old woman presents with palpitations. Her heart rate is 160/min and irregular. Her blood pressure is 123/65 mmHg, and her oxygen saturation is 97% on breathing room air. Her chest is clear on auscultation. Her ECG shows irregular broad complex monomorphic tachycardia with a stable axis. She has no previous medical history and has never been to a hospital before. What is the most appropriate treatment?

- ☐ Diltiazem
- ☐ Bisoprolol
- ☐ Amiodarone
- ☐ Magnesium
- ☐ Adenosine



The correct answer is amiodarone. This is a haemodynamically stable patient with irregular broad complex tachycardia. As the broad-complex tachycardia is irregular it is most likely atrial fibrillation with left bundle branch block or an alternative aberrant conduction pathway such as Wolff-Parkinson-White syndrome. Diltiazem, bisoprolol and adenosine are all contraindicated as they could enhance the aberrant pathway leading to ventricular fibrillation. Magnesium would be appropriate for torsades de pointes but is unlikely as the rhythm is monomorphic.

Source:

Pitcher, David, and Jerry Nolan. 'Peri-arrest Arrhythmias.' Peri-arrest Arrhythmias. N.p., 2015. Web. 09 Feb. 2017

A 72-year-old man is investigated for exertional chest pain and has a positive exercise tolerance test. He declines an angiogram and is discharged on a combination of aspirin 75mg od, simvastatin 40mg on, atenolol 50mg od and a GTN spray prn. Examination reveals a pulse of 72 bpm and a blood pressure of 130/80 mmHg. On review he is still regularly using his GTN spray. What is the most appropriate next step in management?

- ☐ Add nifedipine MR 30mg od
- ☐ Add isosorbide mononitrate 30mg bd
- ☐ Increase atenolol to 100mg od
- ☐ Add nicorandil 10mg bd
- ☐ Add verapamil 80mg tds

Add nifedipine MR 30mg od

22%

Add isosorbide mononitrate 30mg bd

25%

Increase atenolol to 100mg od

37%

Add nicorandil 10mg bd

11%

Add verapamil 80mg tds

4%

When treating angina, if there is a poor response to the first-line drug (e.g. a beta-blocker), the dose should be titrated up before adding another drug

Important for me Less important

The BNF recommends an atenolol dose of 100mg daily in 1 or 2 doses for angina. The starting dose of isosorbide mononitrate is 10mg bd.

Which of the following is a cause of a loud second heart sound?

- ☐ Aortic regurgitation
- ☐ Ventricular septal defect
- ☐ Systemic hypertension
- ☐ Aortic stenosis
- ☐ Mitral stenosis

Aortic regurgitation

9%

Ventricular septal defect

5%

Systemic hypertension

64%

Aortic stenosis

14%

Mitral stenosis

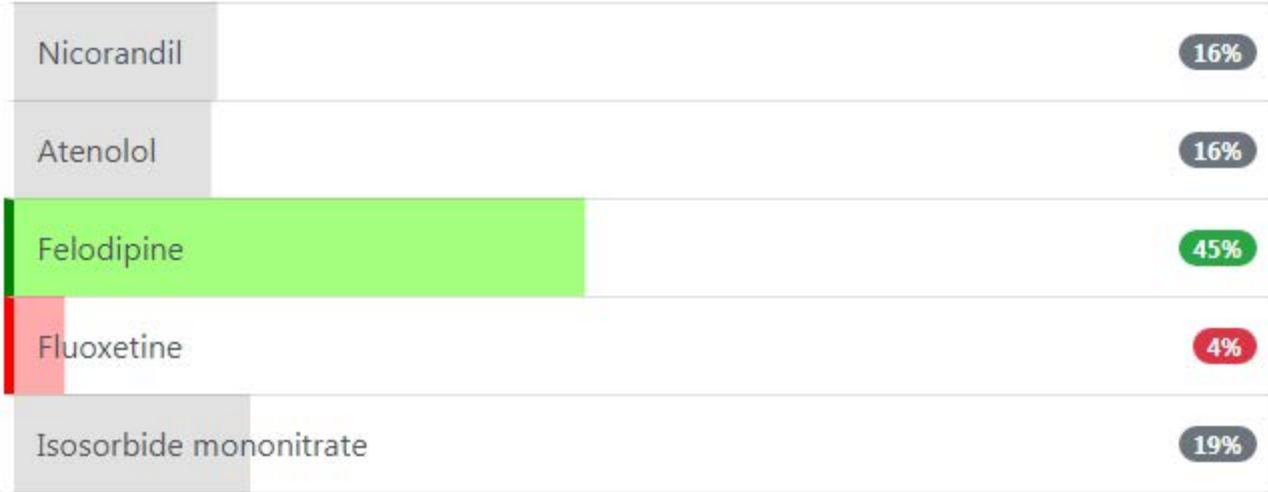
7%

Second heart sound (S2)

- loud: hypertension
- soft: AS
- fixed split: ASD
- reversed split: LBBB

A 54-year-old man with atypical chest pain is referred to cardiology. An exercise ECG shows non-specific ST and T wave changes. Following this a coronary angiogram is performed which demonstrates no evidence of atherosclerosis. A diagnosis of Prinzmetal's angina is suspected. What is the most appropriate first-line treatment?

- ☐ Nicorandil
- ☐ Atenolol
- ☐ Felodipine
- ☐ Fluoxetine
- ☐ Isosorbide mononitrate



Prinzmetal angina - treatment = dihydropyridine calcium channel blocker

Important for me Less important

See the SIGN guidelines for more details.

Which one of the following types of hyperlipidaemia are eruptive xanthoma most commonly associated with?

- ☐ Familial hypertriglyceridaemia
- ☐ Familial hypercholesterolaemia
- ☐ Familial combined hyperlipidaemia
- ☐ Remnant hyperlipidaemia
- ☐ Hyperlipidaemia secondary to nephrotic syndrome

Familial hypertriglyceridaemia

41%

Familial hypercholesterolaemia

37%

Familial combined hyperlipidaemia

8%

Remnant hyperlipidaemia

10%

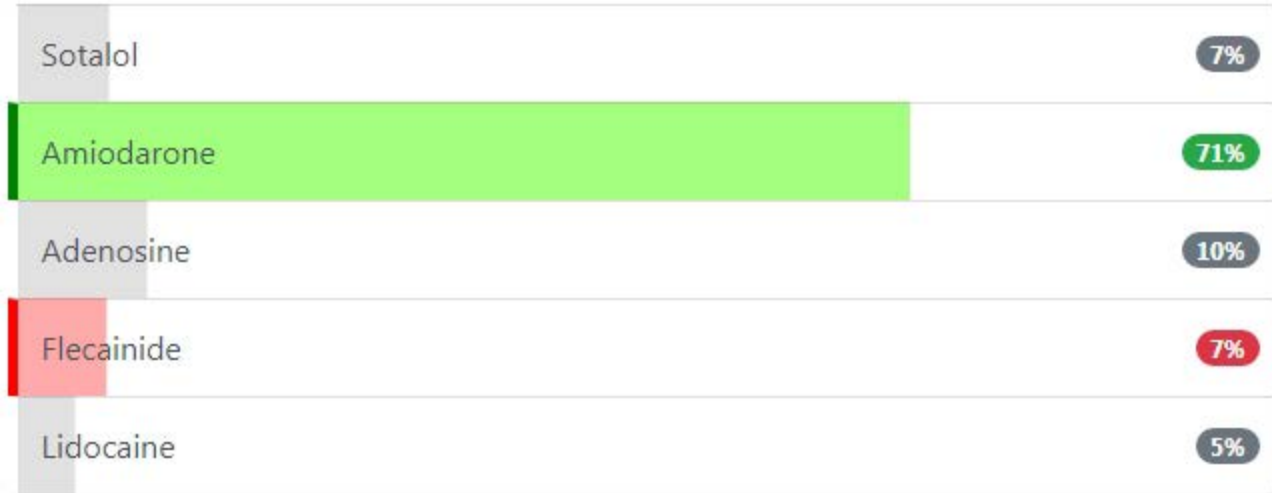
Hyperlipidaemia secondary to nephrotic syndrome

4%

Dr. Assan

A 64-year-old man with a history of ischaemic heart disease and poor left ventricular function presents with a broad complex tachycardia of 140 bpm. On examination blood pressure is 110/74 mmHg. Fusion and capture beats are seen on the 12 lead ECG. What is the first line drug management?

- ☐ Sotalol
- ☐ Amiodarone
- ☐ Adenosine
- ☐ Flecainide
- ☐ Lidocaine



The history of ischaemic heart disease combined with the presence of fusion and capture beats strongly suggests a diagnosis of ventricular tachycardia (VT). Whilst lidocaine can also be used in VT, amiodarone would be preferred given his history of poor left ventricular function. In the 2010 joint European Resuscitation Council and Resuscitation Council (UK) guidelines amiodarone is also considered first-line in a peri-arrest situation

You are considering prescribing an antibiotic to a 28-year-old man who tells you he has Long QT syndrome. Which antibiotic is it most important to avoid?

- ☐ Doxycycline
- ☐ Trimethoprim
- ☐ Erythromycin
- ☐ Rifampicin
- ☐ Co-amoxiclav

Doxycycline

7%

Trimethoprim

4%

Erythromycin

84%

Rifampicin

3%

Co-amoxiclav

2%

Erythromycin can cause a prolonged QT interval

Important for me

Less important

A 15-year-old boy collapses and dies whilst playing football at school. He had no past medical history of note. Post-mortem examination reveals asymmetric concentric enlargement of the myocardial septum. Given the likely diagnosis, what is the chance his sister will also have the same underlying disorder?

- ☐ 0%
- ☐ 25%
- ☐ 50%
- ☐ 100%
- ☐ 66%



Asymmetric septal hypertrophy and systolic anterior movement (SAM) of the anterior leaflet of mitral valve on echocardiogram or cMR support HOCM

Important for me Less important

The underlying diagnosis is hypertrophic obstructive cardiomyopathy which is an autosomal dominant disorder. His sister therefore has a 50% chance of being affected.

Which one of the following is not an indication for insertion of a temporary pacemaker?

- Complete heart block following an inferior MI - blood pressure normal
- Complete heart block following an anterior MI - blood pressure normal
- Trifascicular block prior to surgery
- Mobitz type II heart block following an anterior MI - blood pressure normal
- Symptomatic bradycardia not responding to drug treatment

Complete heart block following an inferior MI - blood pressure normal

35%

Complete heart block following an anterior MI - blood pressure normal

14%

Trifascicular block prior to surgery

19%

Mobitz type II heart block following an anterior MI - blood pressure normal

22%

Symptomatic bradycardia not responding to drug treatment

11%

Complete heart block following an inferior MI is NOT an indication for pacing, unlike with an anterior MI

Important for me Less important

Post-inferior MI complete heart block is common and can be managed conservatively if the patient is asymptomatic and haemodynamically stable

Dr. Arsem

A 21-year-old man collapses whilst playing football with his friends at the weekend. By the time he is brought into the emergency department he is pronounced dead following cardiac arrest despite adequate life support being given. His family cannot understand how this has happened saying that he has always been fit and healthy and was a keen sportsman, they do however note that two other family members have died young in similar circumstances.

Which of the following methods of inheritance is correct for this condition?

- ☐ Autosomal dominant
- ☐ Autosomal recessive
- ☐ X-linked recessive
- ☐ X-linked dominant
- ☐ Mitochondrial

Autosomal dominant

78%

Autosomal recessive

10%

X-linked recessive

5%

X-linked dominant

4%

Mitochondrial

3%

Asymmetric septal hypertrophy and systolic anterior movement (SAM) of the anterior leaflet of mitral valve on echocardiogram or cMR support HOCM

Important for me Less important

Given the circumstances in which this person has died and the family history, one can infer that hypertrophic cardiomyopathy may be a cause. In hypertrophic cardiomyopathy the myocardium becomes thickened which can lead to functional impairment of cardiac muscle and sudden death, especially in young athletes.

It can often run in families and familial hypertrophic cardiomyopathy is inherited in an autosomal dominant pattern and is attributed to a mutation in one of the genes that encodes for a sarcomere protein.

A 58-year-old man with no past medical history of note is admitted to hospital with crushing central chest pain. ECG on arrival shows anterior ST elevation and he is subsequently thrombolysed with a good resolution of symptoms and ECG changes. Four weeks following the event, which combination of drugs should he be taking?

- ACE inhibitor + beta-blocker + statin + aspirin
- Spironolactone + beta-blocker + statin + aspirin
- ACE inhibitor + beta-blocker + statin + aspirin + clopidogrel
- ACE inhibitor + statin + aspirin + clopidogrel
- Beta-blocker + statin + aspirin + clopidogrel

ACE inhibitor + beta-blocker + statin + aspirin	19%
Spironolactone + beta-blocker + statin + aspirin	2%
ACE inhibitor + beta-blocker + statin + aspirin + clopidogrel	62%
ACE inhibitor + statin + aspirin + clopidogrel	8%
Beta-blocker + statin + aspirin + clopidogrel	10%

NICE made the following recommendation in 2013 relating to people who have had a STEMI and medical management with or without reperfusion treatment with a fibrinolytic agent

- offer clopidogrel as a treatment option for at least 1 month and consider continuing for up to 12 months

A 62-year-old patient presents to the Emergency Department with a 25 minute history of crushing central chest pain. ECG shows ST elevation in leads I and aVL. Which coronary territory is likely to be affected?

- ☐ Lateral
- ☐ Posterior
- ☐ Anteroseptal
- ☐ Anterolateral
- ☐ Inferior

Lateral

68%

Posterior

5%

Anteroseptal

6%

Anterolateral

15%

Inferior

6%

These ECG changes are most consistent with a lateral myocardial infarction. An anterolateral infarction is more likely to have changes in the chest leads.

A 62-year-old female with a known history of a sigmoid adenocarcinoma is admitted to hospital with shortness of breath and pyrexia. On examination a murmur is heard and an echo reveals a vegetation on the aortic valve. Which one of the following organisms is most characteristically associated with causing infective endocarditis in patients with colorectal cancer?

- ☐ *Escherichia coli*
- ☐ *Enterococcus faecalis*
- ☐ *Salmonella*
- ☐ *Campylobacter*
- ☐ *Streptococcus bovis*

Escherichia coli

7%

Enterococcus faecalis

12%

Salmonella

4%

Campylobacter

4%

Streptococcus bovis

73%

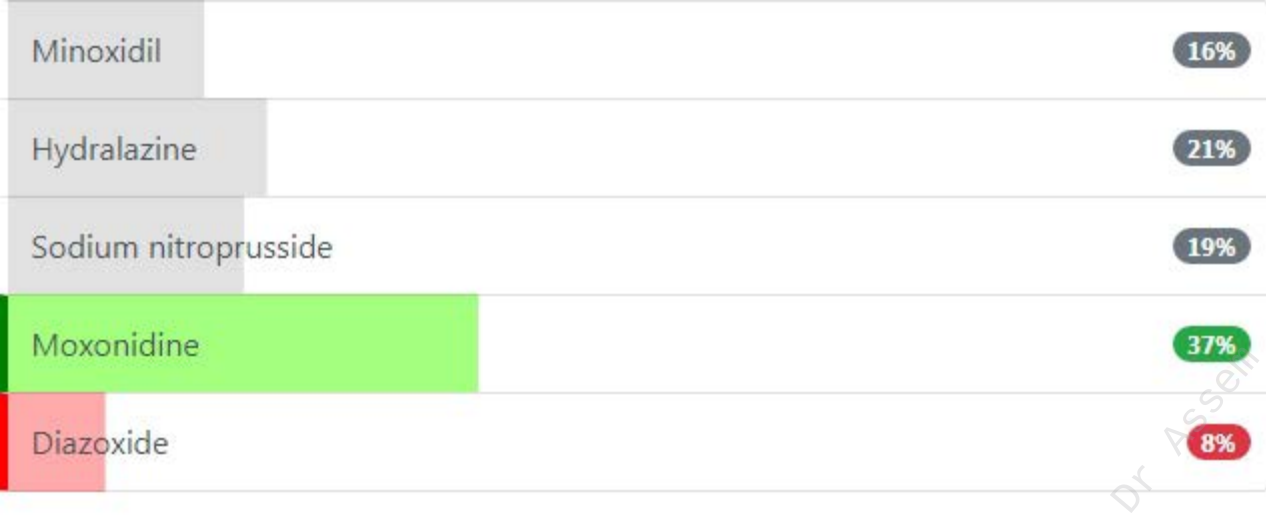
Streptococcus bovis endocarditis is associated with colorectal cancer

Important for me

Less important

Which one of the following is an example of a centrally acting antihypertensive?

- ☐ Minoxidil
- ☐ Hydralazine
- ☐ Sodium nitroprusside
- ☐ Moxonidine
- ☐ Diazoxide



Minoxidil

16%

Hydralazine

21%

Sodium nitroprusside

19%

Moxonidine

37%

Diazoxide

8%

A 68-year-old woman is admitted to hospital with complete heart block. After initially being treated with a temporary pacing wire she goes on to have a permanent pacemaker fitted. How soon after the procedure can she drive again?

☐ Immediately

☐ 24 hours

☐ 3 days

☐ 1 week

☐ 4 weeks

Immediately

11%

24 hours

8%

3 days

6%

1 week

40%

4 weeks

34%

Which one of the following statements regarding the management of pregnant women with severe pre-eclampsia and eclampsia is **incorrect**?

- ☐ Intravenous fluids should be given to prevent renal failure
- ☐ Magnesium sulphate treatment should continue for 24 hours post-partum
- ☐ Problems are only seen after 20 weeks gestation
- ☐ Reflexes should be monitored during magnesium sulphate infusion
- ☐ Magnesium sulphate is given to both prevent and treat seizures

Intravenous fluids should be given to prevent renal failure

58%

Magnesium sulphate treatment should continue for 24 hours post-partum

13%

Problems are only seen after 20 weeks gestation

11%

Reflexes should be monitored during magnesium sulphate infusion

6%

Magnesium sulphate is given to both prevent and treat seizures

12%

Severe pre-eclampsia - restrict fluids

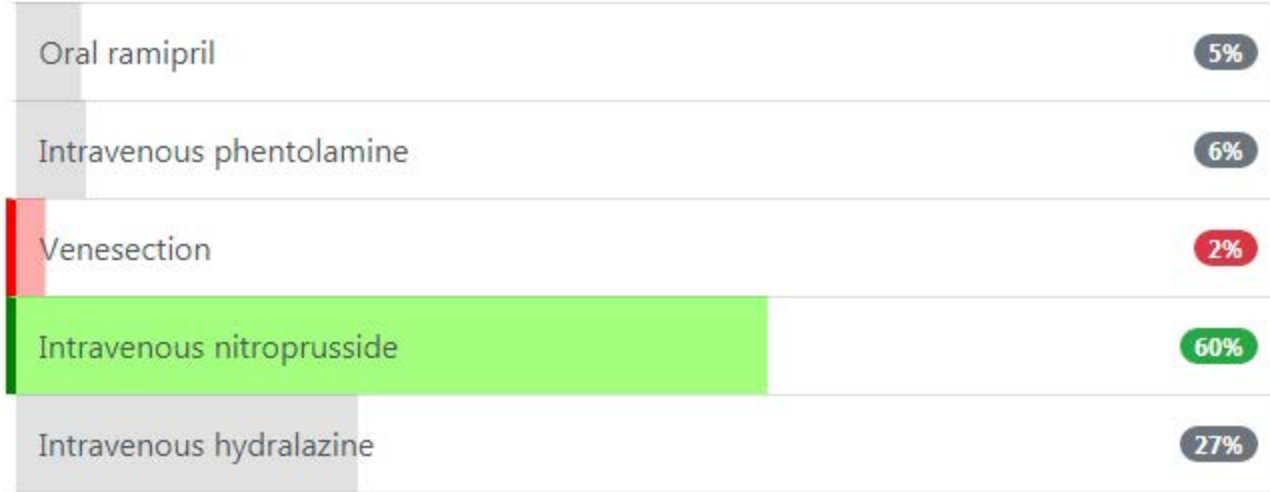
Important for me Less important

Pulmonary and cerebral oedema are important causes of morbidity and mortality in severe pre-eclampsia

Dr Assem

A 56-year-old man is admitted to the Emergency Department with headaches, chest pain and confusion. His initial observations show a blood pressure of 250/140 mmHg, pulse 90/min and temperature of 36.4°. On examination the blood pressure is confirmed and is equal in both arms. Blurring of the optic discs is noted on examination. He has no significant medical history and takes no regular medications. What is the most suitable initial management?

- ☐ Oral ramipril
- ☐ Intravenous phentolamine
- ☐ Venesection
- ☐ Intravenous nitroprusside
- ☐ Intravenous hydralazine



This patient has malignant hypertension. The presence of papilloedema is an indication for the use of intravenous agents rather than slower acting oral preparations.

A 75-year-old man is admitted following after feeling faint. An ECG taken in the department shows a ventricular tachyarrhythmia. His blood pressure is stable and it is decided to give IV amiodarone, with a loading dose being given.

What is the reason for the loading dose being given?

- ☐ Autoinduction of the P450 system by amiodarone
- ☐ High ventricular rate leading to rapid dilution
- ☐ Long half-life of amiodarone
- ☐ Reduce the risk of extravasation injury
- ☐ Amiodarone exhibiting zero-order kinetics

Autoinduction of the P450 system by amiodarone

14%

High ventricular rate leading to rapid dilution

9%

Long half-life of amiodarone

51%

Reduce the risk of extravasation injury

4%

Amiodarone exhibiting zero-order kinetics

22%

Amiodarone has a very long half-life of 20-100 days - loading doses are therefore often needed

Important for me Less important

Dr Assem

A 71-year-old woman presents with palpitations and 'lightheadedness'. An ECG shows that she is in atrial fibrillation with a rate of 130 / min. Her blood pressure is normal and examination of her cardiorespiratory system is otherwise unremarkable. Her past medical history includes well controlled asthma (salbutamol & beclomethasone) and depression (citalopram). Her symptoms have been present for around three days. What is the most appropriate medication to use for rate control?

☐ Diltiazem

☐ Sotalol

☐ Digoxin

☐ Atenolol

☐ Amiodarone



Her history of asthma is a contraindication to the prescription of a beta-blocker. NICE therefore recommend a rate-limiting calcium channel blocker.

Consideration should also be given to antithrombotic therapy.

Which one of the following would not be considered a normal variant on the ECG of an athletic 28-year-old man?

- ☐ Wenckebach phenomenon
- ☐ Sinus bradycardia
- ☐ Junctional rhythm
- ☐ First degree heart block
- ☐ Left bundle branch block

Wenckebach phenomenon

15%

Sinus bradycardia

14%

Junctional rhythm

8%

First degree heart block

8%

Left bundle branch block

55%

Which one of the following is least associated with prolongation of the PR interval?

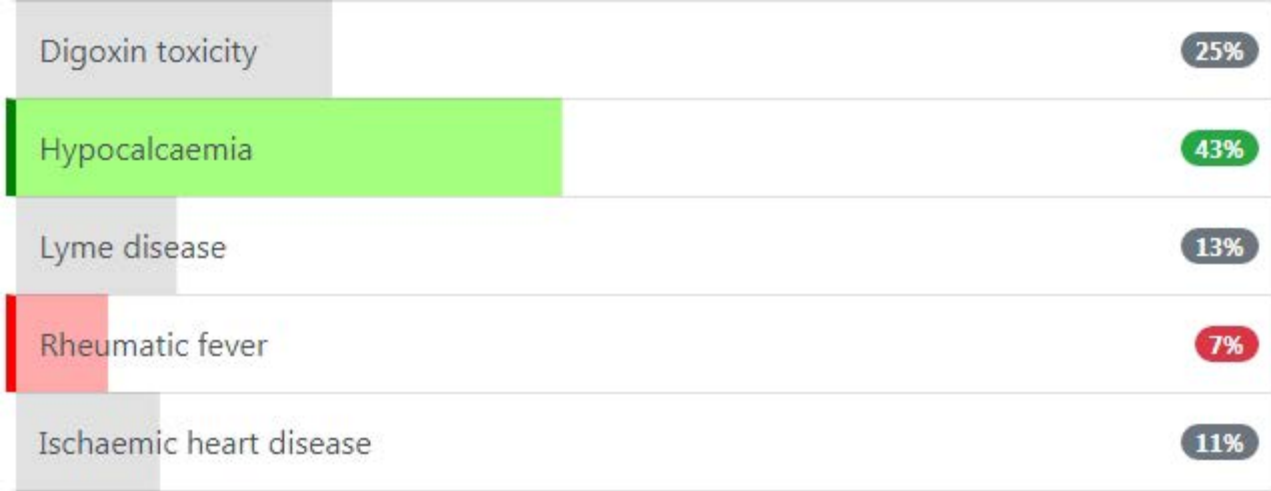
☐ Digoxin toxicity

☐ Hypocalcaemia

☐ Lyme disease

☐ Rheumatic fever

☐ Ischaemic heart disease



Hypocalcaemia is associated with a prolonged QT interval. Hypokalaemia is associated with a prolonged PR interval

Which of the following physiological effects would be expected following administration of atropine?

- ☐ Bradycardia + mydriasis
- ☐ Tachycardia + miosis
- ☐ Bradycardia + salivation
- ☐ Bradycardia + miosis
- ☐ Tachycardia + mydriasis

Bradycardia + mydriasis

14%

Tachycardia + miosis

19%

Bradycardia + salivation

3%

Bradycardia + miosis

9%

Tachycardia + mydriasis

56%

A 44-year-old female is investigated for suspected idiopathic pulmonary hypertension. Which one of the following is the best method for deciding upon management strategy?

- ☐ Genetic testing
- ☐ Acute vasodilator testing
- ☐ Trial of endothelin receptor antagonists
- ☐ Serial echocardiography
- ☐ Trial of calcium channel blockers

Genetic testing

3%

Acute vasodilator testing

74%

Trial of endothelin receptor antagonists

14%

Serial echocardiography

4%

Trial of calcium channel blockers

5%

Acute vasodilator testing should be used in patients with pulmonary artery hypertension to determine which patient show a significant fall in pulmonary arterial pressure following vasodilators and help guide treatment

Important for me Less important

The neprilysin inhibitor, sacubitril, in combination with the angiotensin II receptor blocker, valsartan, has been shown to reduce mortality, reduce hospitalisations and improve symptoms in comparison to enalapril in the treatment of heart failure with reduced ejection fraction. What is its mechanism of action in heart failure?

- ☐ Improves myocardial contraction
- ☐ Prevents the degradation of natriuretic peptides such as BNP and ANP
- ☐ Reduces heart rate
- ☐ Multiple inhibition of renin, angiotensinogen and aldosterone
- ☐ Inhibition of vasopressin release therefore promoting diuresis

Improves myocardial contraction	11%
Prevents the degradation of natriuretic peptides such as BNP and ANP	46%
Reduces heart rate	4%
Multiple inhibition of renin, angiotensinogen and aldosterone	28%
Inhibition of vasopressin release therefore promoting diuresis	10%

The correct answer is prevents the degradation of natriuretic peptides such as BNP and ANP.

The natriuretic peptide system regulates the detrimental effects of the upregulation of the renin-angiotensinogen-aldosterone system (RAAS) which occurs in heart failure. Sodium and water retention and vasoconstriction caused by activation of the RAAS, sympathetic nervous system and the action of vasopressin, lead to increased ventricular preload and afterload and elevated wall stress which in turn lead to production of BNP. BNP acts to promote natriuresis and vasodilation. Atrial stretch leads to the production of ANP which has similar biological properties to BNP. Two strategies have been employed to try and improve outcomes in heart failure via modulation of this pathway. The first is the administration of exogenous natriuretic peptides. Nesiritide, a recombinant human BNP, initially showed promising beneficial effects on haemodynamics and natriuresis in patients with HF. However, in a large-scale randomised controlled trial, it failed to improve

An 84-year-old female with a background of osteoporosis is given an infusion of pamidronate. A week later she presents to her GP complaining of paraesthesia. On examination she has hyperreflexia and carpopedal spasm.

Given the electrolyte abnormality she is likely to have developed, what ECG abnormality is most associated with this?

- ☐ Atrioventricular node block
- ☐ Delta waves
- ☐ Tented T waves
- ☐ Long QT
- ☐ Atrial flutter

Delta waves	6%
Tented T waves	9%
Long QT	79%
Atrial flutter	2%

Long QT is associated with hypocalcaemia. Bisphosphonate infusions can lead to hypocalcaemia although it is more common when using larger doses in malignancy induced hypercalcaemia as oppose to the smaller dose used in osteoporosis.

A QT interval of greater than 0.44 seconds is associated with the development of ventricular arrhythmia, syncope and sudden cardiac death.

Long QT causes:

- electrolyte abnormalities: hypokalemia and hypocalcemia
- drugs: tricyclic antidepressants, antihistamines, erythromycin, clarithromycin, amiodarone, haloperidol
- congenital long QT syndromes: more than 10 different types recognised
- myocardial infarction/significant active myocardial ischemia
- cerebrovascular accident (subarachnoid haemorrhage)
- hypothermia

A 60-year-old man is admitted following an acute coronary syndrome. He receives aspirin, clopidogrel, nitrates and morphine. His 6-month risk score is high and percutaneous coronary intervention is planned. He is therefore given intravenous tirofiban. What is the mechanism of action of this drug?

- ☐ Inhibits the production of thromboxane A₂
- ☐ Activates antithrombin III
- ☐ Coronary vasodilator
- ☐ Glycoprotein IIb/IIIa receptor antagonist
- ☐ Reversible direct thrombin inhibitor

Inhibits the production of thromboxane A₂

5%

Activates antithrombin III

6%

Coronary vasodilator

4%

Glycoprotein IIb/IIIa receptor antagonist

75%

Reversible direct thrombin inhibitor

9%

What is the main mechanism of action of simvastatin?

- ☐ Bile acid sequestrant
- ☐ Decreases hepatic HDL synthesis
- ☐ Inhibits lipoprotein lipase
- ☐ Decreases intrinsic cholesterol synthesis
- ☐ Agonists of PPAR-alpha

Bile acid sequestrant

4%

Decreases hepatic HDL synthesis

9%

Inhibits lipoprotein lipase

16%

Decreases intrinsic cholesterol synthesis

62%

Agonists of PPAR-alpha

9%

Statins inhibit HMG-CoA reductase, the rate-limiting enzyme in hepatic cholesterol synthesis

Important for me Less important

Which one of the following is the strongest risk factor for developing infective endocarditis?

- ☐ Previous episode of infective endocarditis
- ☐ Intravenous drug use
- ☐ Previous rheumatic fever
- ☐ Permanent central venous access line
- ☐ Recent dental surgery

Previous episode of infective endocarditis

65%

Intravenous drug use

19%

Previous rheumatic fever

6%

Permanent central venous access line

7%

Recent dental surgery

2%

Infective endocarditis - strongest risk factor is previous episode of infective endocarditis

Important for me Less important

An 82-year-old man is reviewed. He is known to have ischaemic heart disease and is still getting regular attacks of angina despite taking atenolol 100mg od. Examination of his cardiovascular system is unremarkable with a pulse of 72 bpm and a blood pressure of 148/92 mmHg. What is the most appropriate next step in management?

- ☐ Add verapamil 80mg tds
- ☐ Add nicorandil 10mg bd
- ☐ Add diltiazem 60mg tds
- ☐ Add nifedipine MR 30mg od
- ☐ Add isosorbide mononitrate 30mg bd

Add verapamil 80mg tds

6%

Add nicorandil 10mg bd

15%

Add diltiazem 60mg tds

8%

Add nifedipine MR 30mg od

43%

Add isosorbide mononitrate 30mg bd

28%

If angina is not controlled with a beta-blocker, a calcium channel blocker should be added

Important for me Less important

NICE guidelines recommend adding a calcium channel blocker for angina which is not adequately controlled with beta-blocker monotherapy. Verapamil is contraindicated whilst taking a beta-blocker and diltiazem should be used with caution due to the risk of bradycardia.

The starting dose of isosorbide mononitrate is 10mg bd.

Dr Assem

Which one of the following is least associated with myocarditis?

- ☐ Chagas' disease
- ☐ Lyme disease
- ☐ Leishmaniasis
- ☐ Coxsackie virus
- ☐ Toxoplasmosis

Chagas' disease

11%

Lyme disease

8%

Leishmaniasis

45%

Coxsackie virus

7%

Toxoplasmosis

29%

Dr. ASSOCIATE

A 41-year-old man is admitted with left-sided pleuritic chest pain. He has a dry cough and reports that the pain is relieved by sitting forward. For the past three days he has been experiencing flu-like symptoms. Given the likely diagnosis, what is the most likely finding on ECG?

- ☐ Large S wave in lead I, a large Q wave in lead III and an inverted T wave in lead III
- ☐ Atrial fibrillation
- ☐ Widespread ST elevation
- ☐ ST segment depression in the anterior leads
- ☐ Hyperacute T waves

Large S wave in lead I, a large Q wave in lead III and an inverted T wave in lead III 7%

Atrial fibrillation 2%

Widespread ST elevation 82%

ST segment depression in the anterior leads 7%

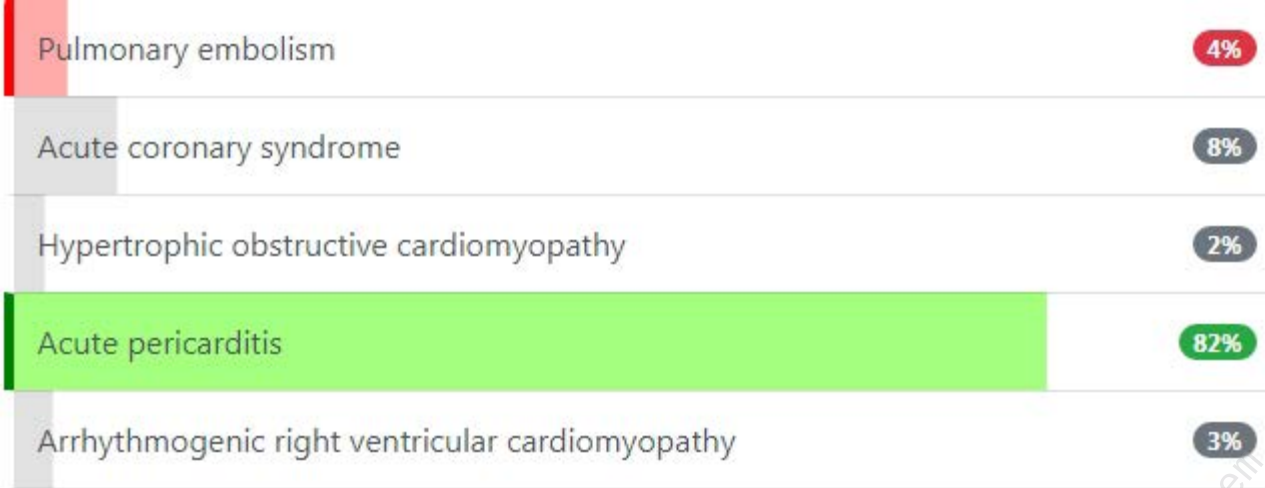
Hyperacute T waves 3%

A 30-year-old woman presents to the Emergency Department with a one-day history of central chest pain. The pain is described as severe, non-radiating and eases on expiration. Clinical examination of her cardiorespiratory system is unremarkable other than a heart rate of 96 / min. An ECG shows widespread ST elevation in the anterior, inferior and lateral leads. Bloods show the following:

Full blood count	Normal
Urea and electrolytes	Normal
Troponin I	0.8 ng/mL (< 0.2 ng/mL)

What is the most likely diagnosis?

- ☐ Pulmonary embolism
- ☐ Acute coronary syndrome
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Acute pericarditis
- ☐ Arrhythmogenic right ventricular cardiomyopathy



A modest rise in troponin is seen in around one-third of patients with acute pericarditis.

A 58-year-old man presents with breathlessness and chest discomfort. He has diet controlled diabetes, hypertension and hyperlipidaemia. He has a weak rapid, regular pulse of 160bpm, blood pressure is 80/50mmHg, he is cold peripherally and crepitations are heard bibasally on auscultation of the chest. An ECG shows a regular broad complex tachycardia.

What is the best initial management of this arrhythmia?

- ☐ Adenosine
- ☐ Amiodarone
- ☐ Diltiazem
- ☐ Electrical cardioversion
- ☐ Vagal manoeuvres

Adenosine	4%
Amiodarone	8%
Diltiazem	1%
Electrical cardioversion	81%
Vagal manoeuvres	5%

This patient presents with a regular broad complex tachycardia with a palpable pulse and the adverse feature of shock (systolic blood pressure <90mmHg), therefore a synchronised DC cardioversion is indicated. If this patient had no adverse features an intravenous amiodarone infusion would be indicated.

Intravenous adenosine and vagal manoeuvres (e.g carotid massage, Valsalva manoeuvre) are indicated for the termination of a regular narrow complex tachycardias.

Diltiazem may be used for rate control in atrial fibrillation.

See: ALS guidelines, peri arrest arrhythmias, resuscitation council, UK.
<https://www.resus.org.uk/resuscitation-guidelines/peri-arrest-arrhythmias/>

You are clerking a 67-year-old man who has been admitted with chest pain. His past medical history includes hypertension, angina and he continues to smoke 20 cigarettes / day. Blood tests done in the Emergency Department show the following:

Na ⁺	133 mmol/l
K ⁺	3.3 mmol/l
Urea	4.5 mmol/l
Creatinine	90 µmol/l

Which one of the following factors is most likely to explain the abnormalities seen in the electrolytes?

- ☐ Enalapril therapy
- ☐ Felodipine therapy
- ☐ Bendroflumethiazide therapy
- ☐ His smoking history
- ☐ Spironolactone therapy

Enalapril therapy	6%
Felodipine therapy	3%
Bendroflumethiazide therapy	82%
His smoking history	2%
Spironolactone therapy	7%

Bendroflumethiazide causes both hyponatraemia and hypokalaemia. Spironolactone is associated with hyperkalaemia. His smoking would only be relevant if he had lung cancer cause syndrome of inappropriate ADH secretion - there is no indication of this from the question.

A 37-year-old woman who was investigated for progressive shortness-of-breath is diagnosed with primary pulmonary hypertension and started on bosentan. What is the mechanism of action of bosentan?

- ☐ Activator of soluble guanylate cyclase
- ☐ Phosphodiesterase type 5 inhibitors
- ☐ Endothelin receptor antagonist
- ☐ Prostanoid
- ☐ Slow calcium channel blocker

Activator of soluble guanylate cyclase

5%

Phosphodiesterase type 5 inhibitors

16%

Endothelin receptor antagonist

67%

Prostanoid

6%

Slow calcium channel blocker

6%

Bosentan - endothelin-1 receptor antagonist

Important for me

Less important

A 47-year-old lady with a family history of sudden cardiac death developed palpitations while visiting a relative in the emergency department. When attached to a cardiac monitor her heart rate was 164/min and the rhythm strip showed a broad complex tachycardia. Which antiarrhythmic may precipitate ventricular fibrillation (VF) if used in such circumstances?

- ☐ Verapamil
- ☐ Amiodarone
- ☐ Procainamide
- ☐ Lidocaine
- ☐ Flecainide

Verapamil	72%
Amiodarone	10%
Procainamide	4%
Lidocaine	4%
Flecainide	10%

Patients with VT should not be prescribed verapamil

Important for me Less important

Verapamil should not be used in patients with Ventricular Tachycardia (VT) as they are class IV antiarrhythmic which only acts on nodal tissue and significantly increase the risk of ventricular fibrillation.

Amiodarone, Procainamide and Lidocaine - All can be used to treat VT.

Flecainide - Has a limited use in certain types of VT.

Dr Assem

A 28-year-old intravenous drug user is brought into the Emergency Department as a stand-by call following a cardiac arrest. He has been using methadone for the past 3 months. Unfortunately attempts to resuscitate him fail. Which one of following underlying problems is most likely to have caused his sudden death?

- ☐ Prolonged QT interval
- ☐ Complete heart block
- ☐ Pulmonary arterial hypertension
- ☐ Cardiomyopathy
- ☐ Hypokalaemia

Prolonged QT interval

70%

Complete heart block

13%

Pulmonary arterial hypertension

4%

Cardiomyopathy

9%

Hypokalaemia

5%

Methadone is a common cause of QT prolongation

Important for me

Less Important

A 30-year-old woman is admitted to the Emergency Department following a suspected peanut allergy. On examination she has gross facial and tongue oedema. Her oxygen saturations are 97% on room air, pulse is 96 / min and blood pressure is 90/62 mmHg. The paramedics have already gained intravenous access. What is the most appropriate way to give adrenaline in this situation?

- ☐ Nebulised
- ☐ Subdermally
- ☐ Intramuscularly
- ☐ Intravenously
- ☐ Subcutaneously



The Resuscitation Council guidelines only recommend giving adrenaline intramuscularly, regardless of whether the patient has intravenous access or not.

A 41-year-old male is diagnosed with idiopathic pulmonary arterial hypertension. He undergoes vasodilator testing with intravenous epoprostenol to which he has a positive response.

What is the most appropriate first-line treatment for his condition?

- ☐ Sildenafil
- ☐ Treprostinil
- ☐ Bosentan
- ☐ Isosorbide mononitrate
- ☐ Nifedipine

Bosentan

15%

Isosorbide mononitrate

5%

Nifedipine

61%

Pulmonary arterial hypertension patients with positive response to vasodilator testing should be treated with calcium channel blockers

Important for me Less important

Patients who test positive to vasodilator testing are typically treated with calcium channel blockers such as nifedipine, diltiazem and increasingly amlodipine, making option 5 the correct answer.

Sildenafil is a phosphodiesterase inhibitor used in patients who test negative to vasodilators.

Treprostinil is a prostacyclin analogue used in patients who do not respond to acute vasodilator testing.

Bosentan is an endothelin receptor antagonist also used for patients with pulmonary arterial hypertension who are negative during vasodilator testing.

Isosorbide mononitrate is used in the treatment of angina not pulmonary arterial hypertension.

Dr Assem

A 42-year-old female who presented with progressive shortness of breath, exertional chest pain and syncope, is found to have a right pulmonary artery pressure of 32 mmHg. She has no other medical conditions and is not on any regular medications. After ruling out other causes she is diagnosed with idiopathic pulmonary arterial hypertension.

What additional investigation will help guide her treatment?

- ☐ Pulmonary artery wedge pressure
- ☐ High resolution CT
- ☐ Ventilation/perfusion scan
- ☐ Vasodilator testing
- ☐ Echocardiogram

Ventilation/perfusion scan

7%

Vasodilator testing

59%

Echocardiogram

13%

Acute vasodilator testing should be used in patients with pulmonary artery hypertension to determine which patient show a significant fall in pulmonary arterial pressure following vasodilators and help guide treatment

Important for me [Less important](#)

This patient has a diagnosis of idiopathic pulmonary artery hypertension with typical symptoms and pulmonary artery pressure greater than 25 mmHg. In patients with pulmonary artery hypertension, initial treatment choice should be guided by acute vasodilator testing. Where the administration of inhaled nitrous oxide or intravenous epoprostenol results in a significant fall in pulmonary arterial pressure patients can be treated with calcium channel blockers. In those, without a fall in pulmonary artery pressure, alternative treatments including phosphodiesterase inhibitor, prostacyclin analogues and endothelin receptor antagonists, should be considered.

Pulmonary artery wedge pressure is an estimate of left atrial pressure, measured by wedging a pulmonary catheter with an inflated balloon into a branch of the pulmonary artery. It is used in diagnosing the severity of left side heart failure, in particular, looking at causes of pulmonary oedema and as such, is not the correct answer.

A 75-year-old gentleman presents to outpatient clinic. He has recently been referred by his general practitioner (GP) after being diagnosed with a left femoral deep vein thrombosis (DVT) 2 weeks ago. In addition to this, he had a metallic aortic valve replacement (AVR) 3 months ago for critical aortic stenosis and has been on warfarin since. As far as you are aware, his international normalised ratio (INR) has been reliably in the target range for this period of time. His other past medical history includes a previous DVT 30 years ago that was unprovoked.

He asks you more about anticoagulation treatment. What is the most appropriate thing to tell him about the duration of therapy required and target INR?

- ☐ It would be advisable to switch him to rivaroxaban as this is the easier alternative to warfarin
- ☐ Lifelong anticoagulation with a target INR of 3.5
- ☐ Lifelong anticoagulation with a target INR 3.0
- ☐ Anticoagulation for 6 months with a target INR of 3.0
- ☐ Lifelong anticoagulation with a target INR of 2.5

It would be advisable to switch him to rivaroxaban as this is the easier alternative to warfarin

2%

Lifelong anticoagulation with a target INR of 3.5

56%

Lifelong anticoagulation with a target INR 3.0

30%

Anticoagulation for 6 months with a target INR of 3.0

4%

Lifelong anticoagulation with a target INR of 2.5

8%

There are a number of factors to consider in this case: a metallic aortic valve replacement requires lifelong anticoagulation but the incidence of recurrent DVT while on anticoagulation is the factor that really determines the correct target INR. NICE guidelines state that for recurrent DVT (while on anticoagulation) the target INR should be 3.5. The target INR for a metallic aortic valve alone is 3.0, while for a prosthetic valve with history of systemic embolism (DVT) the target would be 2.5. Therefore the former option is the most appropriate in this gentleman given the history of recurrent DVT which in this case has more influence than the presence of metallic AVR.

Which of the following congenital heart defects may progress to Eisenmenger's syndrome?

- ☐ Tetralogy of Fallot
- ☐ Coarctation of the aorta
- ☐ Patent ductus arteriosus
- ☐ Tricuspid atresia
- ☐ Transposition of the great arteries

Tetralogy of Fallot

28%

Coarctation of the aorta

4%

Patent ductus arteriosus

56%

Tricuspid atresia

6%

Transposition of the great arteries

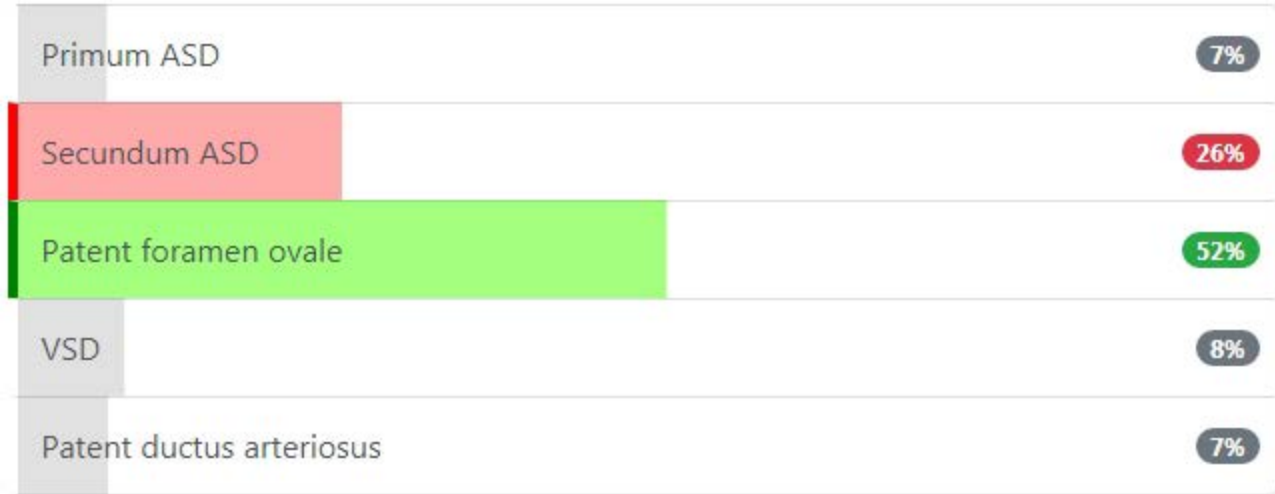
6%

Although patients with tetralogy of Fallot have, by definition, a ventricular septal defect they do not go on to develop Eisenmenger's syndrome

Dr. Assem

A 35-year-old female presents with a deep vein thrombosis in the third trimester of pregnancy. Whilst in the Emergency Department she develops a left hemiparesis. What underlying cardiac abnormality is most likely to be responsible?

- ☐ Primum ASD
- ☐ Secundum ASD
- ☐ Patent foramen ovale
- ☐ VSD
- ☐ Patent ductus arteriosus



Whilst atrial septal defects may allow emboli to pass from the right side of the heart to the left side, the most common cause is a patent foramen ovale

A 57-year-old man presents to the Emergency Department with a 15 minute history of severe central chest pain radiating to his left arm. ECG shows T-wave inversion in leads I, V5 and V6. Which coronary artery is most likely to be affected?

- ☐ Left circumflex
- ☐ Posterior interventricular
- ☐ Left main stem
- ☐ Right coronary
- ☐ Left anterior descending

Left circumflex

70%

Posterior interventricular

5%

Left main stem

3%

Right coronary

7%

Left anterior descending

15%

Ischaemic changes in leads I, aVL +/- V5-6 - left circumflex

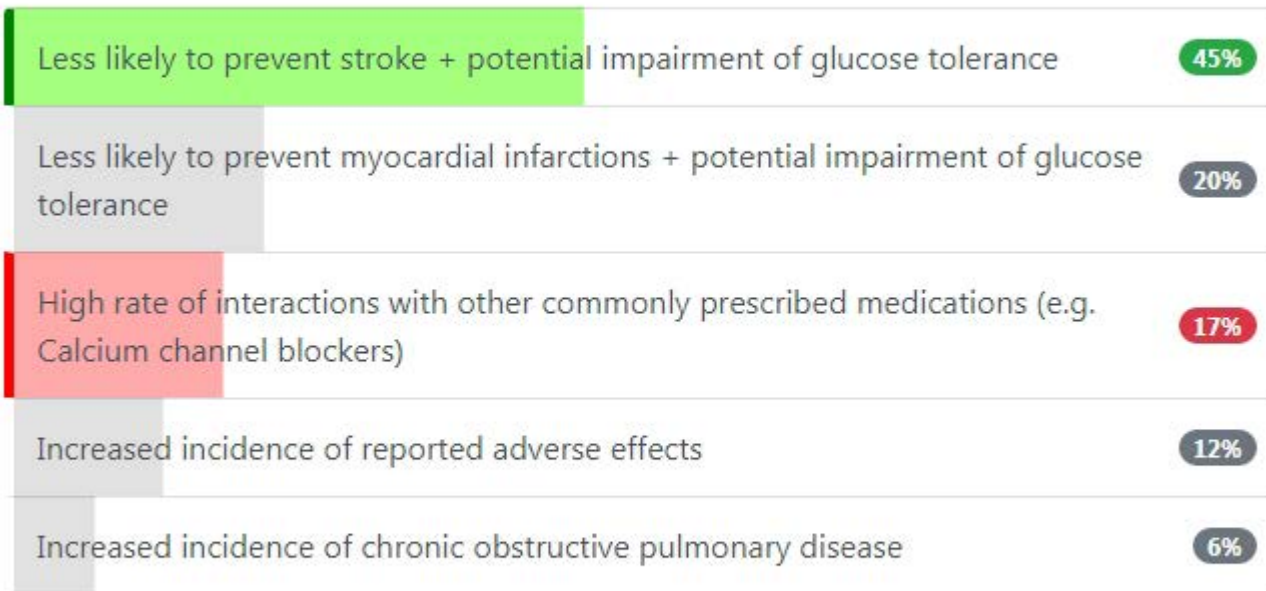
Important for me Less important

This is most typical of a left circumflex occlusion although may rarely be seen if the left anterior descending is affected

The use of beta-blockers in treating hypertension has declined sharply in the past five years. Which one of the following best describes the reasons why this has occurred?

- Less likely to prevent stroke + potential impairment of glucose tolerance
- Less likely to prevent myocardial infarctions + potential impairment of glucose tolerance
- High rate of interactions with other commonly prescribed medications (e.g. Calcium channel blockers)
- Increased incidence of reported adverse effects
- Increased incidence of chronic obstructive pulmonary disease

The use of beta-blockers in treating hypertension has declined sharply in the past five years. Which one of the following best describes the reasons why this has occurred?



This was demonstrated in the Anglo-Scandinavian Cardiac Outcomes Trial-Blood Pressure Lowering Arm (ASCOT-BPLA).

A 64-year-old man is having a dual chamber pacemaker inserted. The ventricular lead is to be inserted via the coronary sinus. Where does the coronary sinus drain into?

- ☐ Right atrium
- ☐ Left ventricle
- ☐ Right ventricle
- ☐ Inferior vena cava
- ☐ Left atrium

Right atrium

65%

Left ventricle

7%

Right ventricle

7%

Inferior vena cava

8%

Left atrium

13%

A 66-year-old lady presented to the emergency department with a 5-minute history of right upper limb weakness which spontaneously resolved. She had a past medical history of hypertension, for which she is taking amlodipine 10mg once daily. She is not diabetic. She currently smokes 10 cigarettes a day. Her examination was remarkable for an irregularly irregular heartbeat. Electrocardiogram confirms a diagnosis of atrial fibrillation. CT head showed no evidence of intracranial haemorrhage. She is otherwise well with a normal renal function. What is the most appropriate next step?

- ☐ Refer to anti coagulation clinic
- ☐ Start 300mg aspirin and discharge home
- ☐ Non-urgent referral to the TIA clinic
- ☐ Commence the patient on anticoagulation
- ☐ Refer the patient to psychiatry

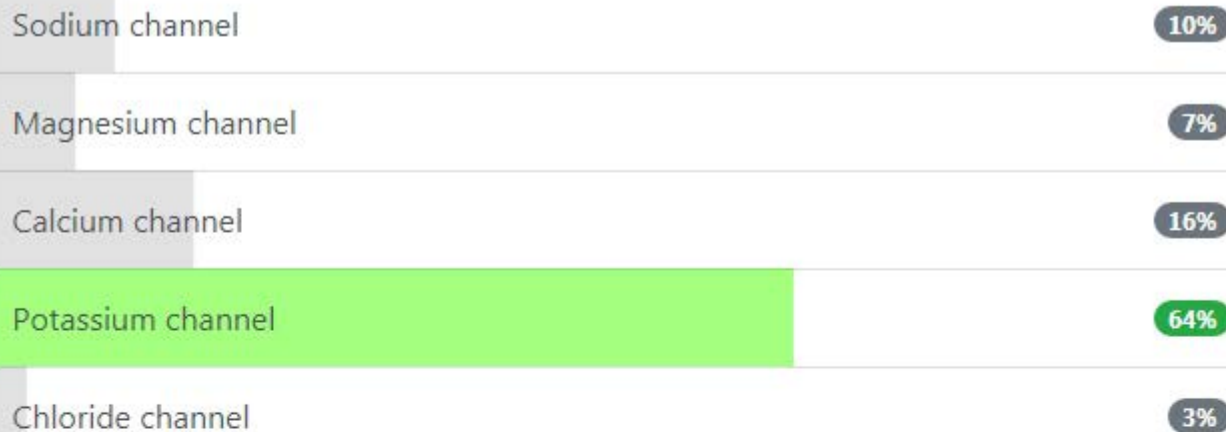
Refer to anti coagulation clinic	9%
Start 300mg aspirin and discharge home	8%
Non-urgent referral to the TIA clinic	8%
Commence the patient on anticoagulation	73%
Refer the patient to psychiatry	2%

This lady has had a transient ischaemic attack (TIA) on a background of atrial fibrillation. In view of her ABCD2 score, she will require referral to the TIA clinic. The presence of AF is independently considered to place the patient in the high-risk category, and will, therefore necessitate urgent referral to the TIA clinic.

Her CHADS-VASC score will necessitate anti-coagulation. Given the lack of efficacy of aspirin in AF, it is important that this lady is commenced on anticoagulation as a priority to reduce the risk of further stroke in the interim. The CT head has ruled out intra-cranial haemorrhage, and therefore this TIA is likely a cardio-embolic phenomenon for which anticoagulation is more efficacious than aspirin. Clearly, a psychiatric referral is inappropriate.

A 33-year-old male who is an ex-IV drug user on methadone collapses suddenly whilst out shopping. A paramedic crew are quickly on the scene. The patient remains conscious but whilst attached to the defibrillator multiple self-terminating runs of polymorphic ventricular tachycardia are seen. He is transferred urgently to the emergency department where torsades de points is confirmed. He is successfully treated with an infusion of IV magnesium. An ECG post infusion shows a QTc of 590ms and he tells you that he is currently on day five of a seven day course of erythromycin for a lower respiratory tract infection. You suspect drug induced QTc prolongation secondary to a combination of methadone and erythromycin predisposing him to torsades de points. Which cardiac ion channel is most likely to be affected?

- ☐ Sodium channel
- ☐ Magnesium channel
- ☐ Calcium channel
- ☐ Potassium channel
- ☐ Chloride channel



Several medications, including drugs prescribed for non-cardiac indications, have been associated with a prolongation of the QT interval on the surface ECG. Under certain circumstances, this clinical manifestation may reflect an increased risk for patients presenting with a polymorphic ventricular tachycardia known as torsade de pointes. Drugs that prolong the QT interval belong to several pharmacological classes, but most of them share one pharmacological effect: they lengthen cardiac re-polarisation mostly by blocking specific cardiac potassium channels. The potent blocking of cardiac potassium channels and excessive lengthening of cardiac re-polarisation favour the development of membrane oscillations (early after-depolarisation) due to calcium/sodium re-entry. Early after-depolarisation, when propagated, may trigger torsade de pointes. In addition to excessive lengthening of the QT interval, other predisposing factors to drug-induced torsade de pointes include bradycardia, electrolyte imbalance, female sex and genetic polymorphisms in various ion channel constituents.

Which one of the following is the most common underlying mechanism causing prolongation of the QT segment?

- ☐ Opening of calcium channels
- ☐ Blockage of sodium channels
- ☐ Opening of sodium channels
- ☐ Blockage of potassium channels
- ☐ Opening of potassium channels

Opening of calcium channels

12%

Blockage of sodium channels

9%

Opening of sodium channels

5%

Blockage of potassium channels

62%

Opening of potassium channels

13%

Long QT syndrome - usually due to loss-of-function/blockage of K⁺ channels

Important for me Less important

In long QT syndrome QT prolongation is due to overload of myocardial cells with positively charged ions during ventricular repolarisation. Around 90-95% of inherited causes are due to defects in potassium channels

Dr. Assem

A 45-year-old man presents with palpitations that began around 40 minutes ago. Other than having a stressful day at work there appears to have been no obvious trigger. He denies any chest pain or dyspnoea. An ECG shows a regular tachycardia of 180 bpm with a QRS duration of 0.10s. Blood pressure is 106/70 mmHg and oxygen saturations are 98% on room air. You ask him to perform the Valsava manoeuvre but this has no effect on the rhythm. What is the most appropriate next course of action?

- ☐ Electrical cardioversion
- ☐ Intravenous labetalol
- ☐ Intravenous adenosine
- ☐ Intravenous amiodarone
- ☐ Re-attempt Valsava manoeuvre in 5 minutes



This patient has a supraventricular tachycardia with no adverse signs (e.g. shock, myocardial ischaemia etc). If vagal manoeuvres fail intravenous adenosine should be given.

Which one of the following statements regarding Brugada syndrome is correct?

- ☐ Usually inherited as an autosomal recessive disease
- ☐ Is associated with left bundle branch block
- ☐ Most common presentation is dilated cardiomyopathy
- ☐ Management is with beta-blockers
- ☐ More common in Asians

Usually inherited as an autosomal recessive disease

16%

Is associated with left bundle branch block

15%

Most common presentation is dilated cardiomyopathy

6%

Management is with beta-blockers

9%

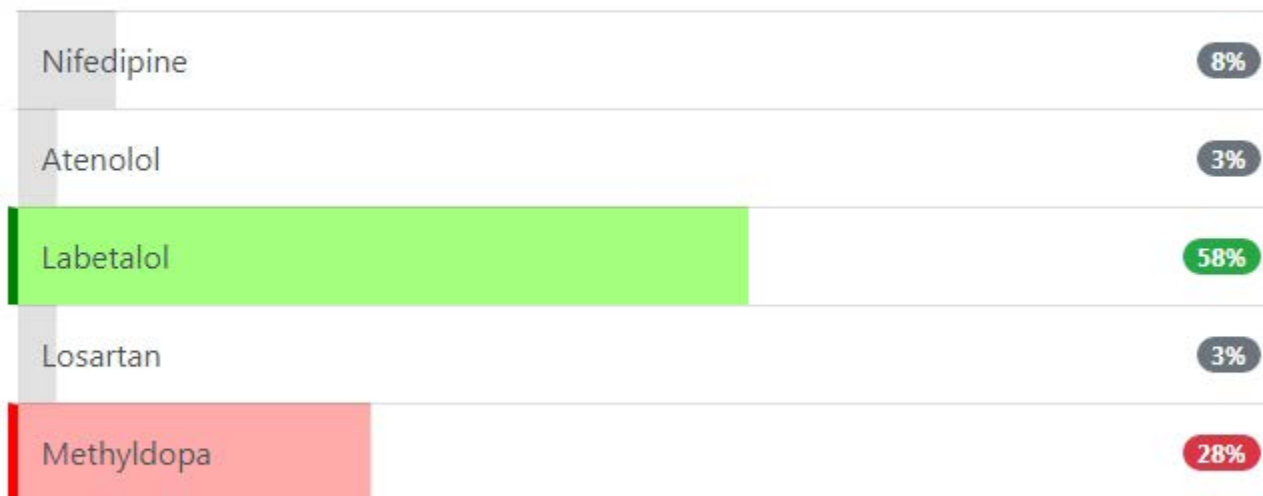
More common in Asians

54%

A woman who is 34 weeks pregnant is admitted to the obstetric ward. She has been monitored for the past few weeks due to pregnancy-induced hypertension but has now developed proteinuria. Her blood pressure is 162/94 mmHg. Which one of the following antihypertensives is it most appropriate to commence?

- ☐ Nifedipine
- ☐ Atenolol
- ☐ Labetalol
- ☐ Losartan
- ☐ Methyldopa

A woman who is 34 weeks pregnant is admitted to the obstetric ward. She has been monitored for the past few weeks due to pregnancy-induced hypertension but has now developed proteinuria. Her blood pressure is 162/94 mmHg. Which one of the following antihypertensives is it most appropriate to commence?



Labetalol is first-line for pregnancy-induced hypertension

Important for me Less important

A 62-year-old male is admitted with right sided hemiplegia. An MRI confirms a diagnosis of a left sided partial anterior circulating stroke. He is treated with high dose aspirin for 14 days. He is then started on clopidogrel which he was unfortunately intolerant of. You therefore start him on dual aspirin and dipyridamole.

What is the mechanism of action of dipyridamole?

- ☐ Inhibition of production of factors II, VII, IX and X
- ☐ Increases the effects of adenosine
- ☐ Cyclooxygenase inhibitor
- ☐ Glycoprotein IIb/IIIa inhibitor
- ☐ Direct thrombin inhibitors

Increases the effects of adenosine

47%

Cyclooxygenase inhibitor

14%

Glycoprotein IIb/IIIa inhibitor

18%

Direct thrombin inhibitors

15%

Dipyridamole increases the effects of adenosine

Important for me Less important

Dipyridamole increases the levels adenosine and inhibits the phosphodiesterase enzymes that normally break down cAMP. Exogenous use of adenosine (e.g. treatment of supraventricular tachycardia) is contraindicated in patients on dipyridamole for this reason.

Clopidogrel is an ADP receptor antagonist.

Aspirin is a cyclo-oxygenase inhibitor.

Dabigatran and bivalirudin are direct thrombin inhibitors.

Tirofiban and abciximab are glycoprotein IIb/IIIa inhibitors.

Mr Brown is a 62-year-old man with colon cancer. He is undergoing adjuvant chemotherapy, however in the past six months has suffered four deep vein thrombotic (DVT) events, despite being optimally anti-coagulated with the maximum dose of dabigatran. On one occasion he suffered a DVT during treatment with dalteparin (a low molecular weight heparin) . He has been admitted with symptoms of another DVT.

How should his DVT be treated?

- ☐ Add apixaban to his prescription
- ☐ Initiate end of life drugs and prepare the family
- ☐ Increase the dose of dabigatran off-licence
- ☐ Prescribe Thrombo-Embolism Deterrent (TED) stockings
- ☐ Insert an inferior vena caval filter

Increase the dose of dabigatran off-licence

5%

Prescribe Thrombo-Embolic Deterrent (TED) stockings

6%

Insert an inferior vena caval filter

75%

Patients with recurrent venous thromboembolic disease may be considered for an inferior vena cava filter

Important for me [Less important](#)

This patient has cancer and suffered multiple DVTs in a short space of time, despite being fully anti-coagulated. NICE have produced guidelines on such patients:

'Consider inferior vena caval filters for patients with recurrent proximal DVT or PE despite adequate anticoagulation treatment only after considering alternative treatments such as:

- increasing target INR to 3–4 for long term high-intensity oral anticoagulant therapy or
- switching treatment to LMWH.'

[NICE (2015) Venous thromboembolic diseases: diagnosis, management and thrombophilia testing. CG144]

Add apixaban to his prescription - This is not the most appropriate answer. This patient has already been treated on a LMWH. An inferior vena caval filter is the most appropriate next step.

A 60-year-old man is transferred from the local psychiatric unit to the Emergency Department. Throughout the day he has complained of palpitations and feeling light-headed. The psychiatry consultant noted he was tachycardic and requested a transfer. An ECG taken following admission shows a broad complex tachycardia consistent with torsades de pointes, rate 120/min. His blood pressure is 122/80 mmHg and there are no signs of heart failure. What is the most appropriate management?

- ☐ Intravenous naloxone
- ☐ Intravenous magnesium sulphate
- ☐ DC cardioversion
- ☐ Intravenous amiodarone
- ☐ Intravenous verapamil

Intravenous naloxone

2%

Intravenous magnesium sulphate

79%

DC cardioversion

5%

Intravenous amiodarone

11%

Intravenous verapamil

3%

A 13-year-old male immigrant from India presents to his primary care physician with a gradually worsening shortness of breath worse on physical exertion as well as widespread joint pain. His past medical history includes a severe throat infection which was untreated. His vaccination record is complete. On physical examination, there is a high-pitch holosystolic murmur loudest at the apex with radiation to the axilla.

Hb	135 g/l
Platelets	$150 \times 10^9/l$
WBC	$9.5 \times 10^9/l$
Anti-streptolysin O titres	>200units/mL

What is the most likely histological finding in his heart?

- ☐ Aschoff bodies
- ☐ Councilman bodies
- ☐ Mallory bodies
- ☐ Call-Exner bodies
- ☐ Schiller-Duval bodies

Aschoff bodies	70%
Councilman bodies	5%
Mallory bodies	15%
Call-Exner bodies	3%
Schiller-Duval bodies	7%

Aschoff bodies are granulomatous nodules found in rheumatic heart fever

Important for me Less important

This patient has rheumatic heart disease. Mitral valve is the most common valve to be affected. ASO titre indicates exposure to group A streptococcus bacteria.

Aschoff bodies (granuloma with giant cells) and Anitschkow cells (enlarged macrophages with ovoid, wavy, rod-like nucleus) are seen in rheumatic heart disease.

Other answers:

- Councilman bodies -> hepatitis C, yellow fever
- Mallory bodies -> alcoholism (hepatocytes)
- Call-Exner bodies-> granulosa cell tumour
- Schiller-Duval bodies -> yolk-sac tumour

Which one of the following complications is least associated with ventricular septal defects?

- ☐ Right heart failure
- ☐ Aortic regurgitation
- ☐ Eisenmenger's complex
- ☐ Infective endocarditis
- ☐ Atrial fibrillation

Which one of the following complications is least associated with ventricular septal defects?

Right heart failure

7%

Aortic regurgitation

21%

Eisenmenger's complex

8%

Infective endocarditis

20%

Atrial fibrillation

43%

Atrial fibrillation is associated more with atrial septal defects

A 31 year-old smoker is seen in the Emergency Department with a 3-day history of worsening, left-sided pleuritic chest pain, associated with worsening shortness of breath. He has no past medical history. His observations are: blood pressure 78/46 mmHg, saturations 81% on 8L/min oxygen via face mask, heart rate 147 bpm and temperature 37.3 degrees Celsius. He appears clammy, pale and unwell.

On examination, lung auscultation is normal. An ECG shows sinus tachycardia with right heart strain. He has not responded to adequate fluid resuscitation. After applying high-flow oxygen, what is the best course of action?

- ☐ Urgent computed tomography pulmonary angiogram (CTPA)
- ☐ Intravenous fluid resuscitation and broad-spectrum antibiotics
- ☐ Intravenous alteplase
- ☐ Urgent transthoracic echocardiography
- ☐ Admission for treatment-dose low molecular weight heparin (LWMH)

Urgent computed tomography pulmonary angiogram (CTPA)

36%

Intravenous fluid resuscitation and broad-spectrum antibiotics

4%

Intravenous alteplase

45%

Urgent transthoracic echocardiography

6%

Admission for treatment-dose low molecular weight heparin (LWMH)

9%

Massive PE + hypotension - thrombolysed

Important for me Less important

This man has a history consistent with pulmonary embolism (PE), with significant haemodynamic instability as evidenced by his hypotension and tachycardia. Although both a transthoracic echocardiogram and CTPA would be useful investigations, treatment should not be delayed in these circumstances. The British Thoracic Society guidelines for treatment of PE state that thrombolysis 'may be instituted on clinical grounds alone if cardiac arrest is imminent' as in this case.

A 34-year-old man is seen in the cardiology clinic. He has been referred by his GP with a history of increasing dyspnoea and exercise-related syncope. His father died suddenly when at the age of 42-years-old. An ECG attached to the admission letter shows left ventricular hypertrophy with widespread T wave inversion. Given the likely diagnosis, what is the most appropriate next investigation?

- ☐ Cardiac angiogram
- ☐ Transthoracic echo
- ☐ Transoesophageal echo
- ☐ Exercise ECG
- ☐ 24-hour ECG

Cardiac angiogram	5%
Transthoracic echo	65%
Transoesophageal echo	21%
Exercise ECG	4%
24-hour ECG	5%

The likely diagnosis is hypertrophic obstructive cardiomyopathy which should be investigated with a transthoracic echocardiogram, as recommended by the 2011 American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA) guidelines.

An 82-year-old lady is brought into the emergency department by the paramedics. She has been off her feet for the last week in her care home and is now unresponsive. When she arrives her temperature is recorded and found to be 28°C.

Given her presentation what changes would you expect to see on an ECG?

- ☐ Q-waves
- ☐ Delta waves
- ☐ Saddle ST-elevation
- ☐ Sinus tachycardia
- ☐ J-waves

Q-waves	7%
Delta waves	9%
Saddle ST-elevation	8%
Sinus tachycardia	6%
J-waves	70%

J-waves are associated with hypothermia

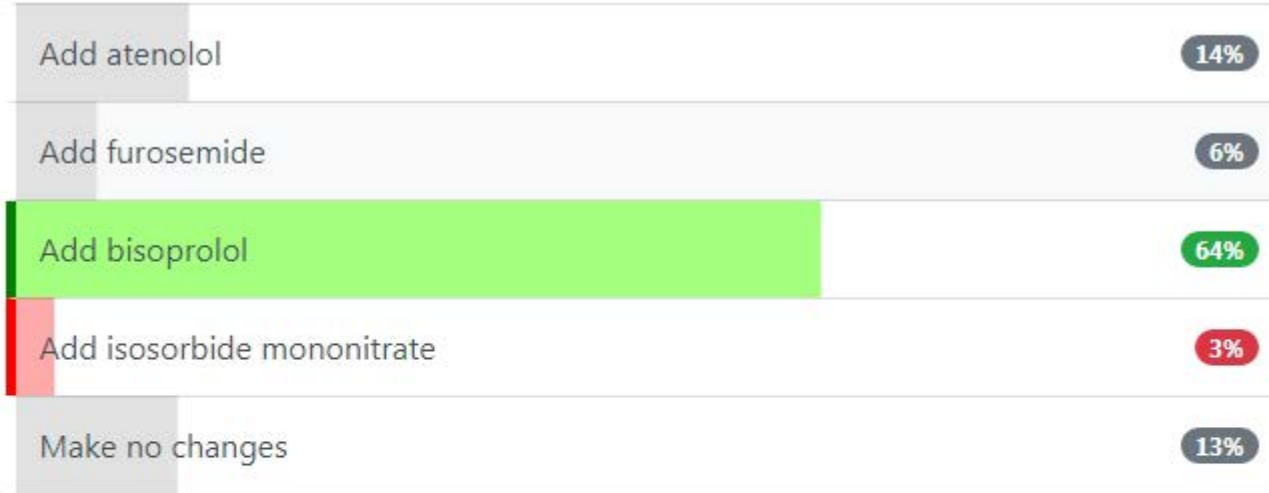
Important for me Less important

This question is asking about an 82-year-old lady presenting with hypothermia and asking for ECG changes you would expect to see. Therefore the correct answer is J-waves. These are small bumps at the end of the QRS complex.

- Q-waves are associated with a previous myocardial infarction
- Delta waves are associated with Wolff-Parkinson-White Syndrome
- Saddle ST elevation is associated with pericarditis
- Sinus tachycardia would not be expected as patients with hypothermia are often bradycardic

You review a 62-year-old man who has recently been discharged from hospital in Hungary following a myocardial infarction. He brings a copy of an echocardiogram report which shows his left ventricular ejection fraction is 38%. On examination his pulse is 78 / min and regular, blood pressure is 124 / 72 mmHg and his chest is clear. His current medications include aspirin, simvastatin and lisinopril. What is the most appropriate next step in terms of his medication?

- ☐ Add atenolol
- ☐ Add furosemide
- ☐ Add bisoprolol
- ☐ Add isosorbide mononitrate
- ☐ Make no changes



Both carvedilol and bisoprolol have been shown to reduce mortality in stable heart failure. The other beta-blockers have no evidence base to support their use.

NICE recommend that all heart failure patients should take both an ACE-inhibitor and a beta-blocker.

A 37-year-old woman presents for review. She is 26 weeks pregnant and has had no problems with her pregnancy to date. Blood pressure is 144/92 mmHg, a rise from her booking reading of 110/80 mmHg. Urine dipstick reveals the following:

Protein	negative
Leucocytes	negative
Blood	negative

What is the most appropriate description of her condition?

- ☐ Moderate pre-eclampsia
- ☐ Mild pre-eclampsia
- ☐ Gestational hypertension
- ☐ Normal physiological change in blood pressure
- ☐ Pre-existing hypertension

Moderate pre-eclampsia

2%

Mild pre-eclampsia

5%

Gestational hypertension

77%

Normal physiological change in blood pressure

12%

Pre-existing hypertension

4%

A patient is admitted with central chest pain and a diagnosis of non-ST elevation myocardial infarction is made. Aspirin and fondaparinux are given. What is the mechanism of action of fondaparinux?

- ☐ Reversible direct thrombin inhibitor
- ☐ Glycoprotein IIb/IIIa receptor antagonist
- ☐ Inhibits antithrombin III
- ☐ Inhibits ADP binding to its platelet receptor
- ☐ Activates antithrombin III

Reversible direct thrombin inhibitor

17%

Glycoprotein IIb/IIIa receptor antagonist

16%

Inhibits antithrombin III

20%

Inhibits ADP binding to its platelet receptor

7%

Activates antithrombin III

40%

Fondaparinux works in a similar way to low-molecular weight heparin.

Dr Assem

Which of the following is least associated with a poor prognosis in hypertrophic cardiomyopathy?

- ☐ Non-sustained ventricular tachycardia on 24 or 48-hour Holter monitoring
- ☐ Reduced left ventricular outflow gradient
- ☐ Family history of sudden death
- ☐ Syncope
- ☐ Early age at presentation

Non-sustained ventricular tachycardia on 24 or 48-hour Holter monitoring

22%

Reduced left ventricular outflow gradient

42%

Family history of sudden death

9%

Syncope

9%

Early age at presentation

19%

There is no recognised prognostic association with left ventricular outflow gradient

A 65-year-old female with a history of chronic obstructive pulmonary disease (COPD) is reviewed in the Emergency Department. She has presented with a sudden worsening of her dyspnoea associated with haemoptysis. What is the most suitable initial imaging investigation to exclude a pulmonary embolism?

- ☐ Ventilation-perfusion scan
- ☐ Echocardiogram
- ☐ Pulmonary angiography
- ☐ Computed tomographic pulmonary angiography
- ☐ MRI thorax

Ventilation-perfusion scan

6%

Echocardiogram

4%

Pulmonary angiography

6%

Computed tomographic pulmonary angiography

82%

MRI thorax

2%

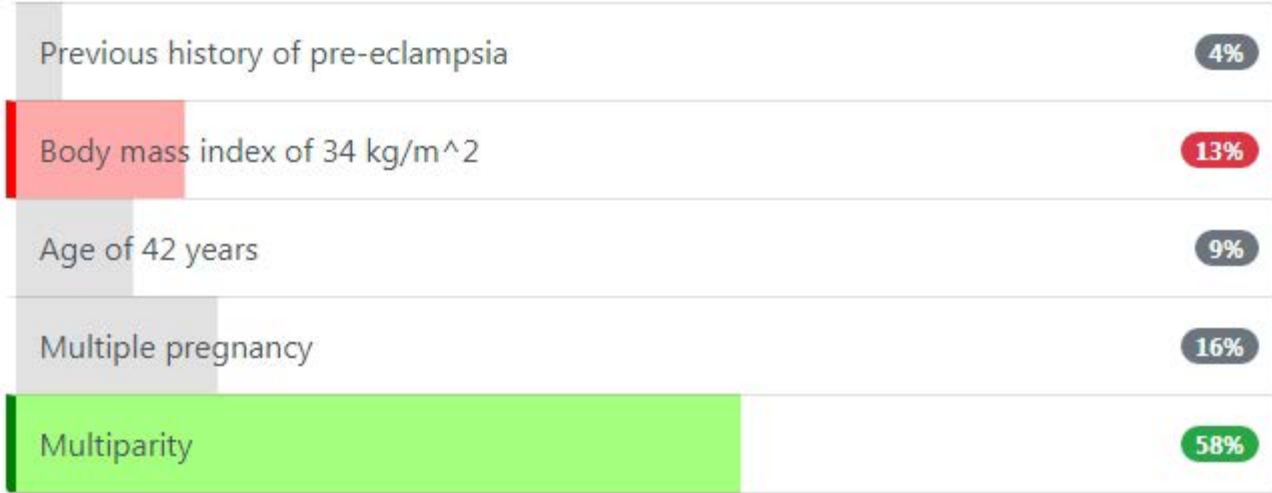
Pulmonary embolism - CTPA is first-line investigation

Important for me [Less important](#)

It is still common in UK hospitals, despite guidelines, for a ventilation-perfusion scan to be done first-line

Which one of the following is not a risk factor for the development of pre-eclampsia?

- ☐ Previous history of pre-eclampsia
- ☐ Body mass index of 34 kg/m²
- ☐ Age of 42 years
- ☐ Multiple pregnancy
- ☐ Multiparity



No previous pregnancies is a risk factor for pre-eclampsia. Questions on maternal health during pregnancy are now common in the MRCP

A patient who takes bendroflumethiazide is noted to have a potassium of 3.1 mmol/l. What is the main mechanism causing hypokalaemia in patients taking bendroflumethiazide?

- Decreased flow rate in the nephron resulting in a decreased potassium gradient
- Increased sodium reaching the collecting ducts
- Inhibition of renin-angiotensin-aldosterone system secondary to hypovolaemia
- Decreased sodium reaching the distal convoluted tubule
- Opening of potassium channel in proximal convoluted tubule

Decreased flow rate in the nephron resulting in a decreased potassium gradient 4%

Increased sodium reaching the collecting ducts 38%

Inhibition of renin-angiotensin-aldosterone system secondary to hypovolaemia 7%

Decreased sodium reaching the distal convoluted tubule 29%

Opening of potassium channel in proximal convoluted tubule 22%

Bendroflumethiazide - inhibits sodium reabsorption by blocking the $\text{Na}^+\text{-Cl}^-$ symporter at the beginning of the distal convoluted tubule

Important for me Less important

Increased delivery of sodium to the collecting ducts causes the sodium-potassium exchanger to release more potassium into the urine. Another cause is activation of the renin-angiotensin-aldosterone system secondary to hypovolaemia

A 54-year-old man is admitted with suspected pulmonary embolism. He has no past medical history of note. Blood pressure is 120/80 mmHg with a pulse of 90/min. The chest x-ray is normal. Following treatment with low-molecular weight heparin, what is the most appropriate initial lung imaging investigation to perform?

- ☐ Pulmonary angiography
- ☐ Echocardiogram
- ☐ MRI thorax
- ☐ Ventilation-perfusion scan
- ☐ Computed tomographic pulmonary angiography

Pulmonary angiography	5%
Echocardiogram	3%
MRI thorax	1%
Ventilation-perfusion scan	6%
Computed tomographic pulmonary angiography	84%

Pulmonary embolism - CTPA is first-line investigation

Important for me Less important

This is a difficult question to answer as both computed tomographic pulmonary angiography (CTPA) and ventilation-perfusion scanning are commonly used in UK clinical practice. The 2003 British Thoracic Society (BTS) guidelines, however, recommended that CTPA is now used as the initial lung imaging modality of choice. Pulmonary angiography is of course the 'gold standard' but this is not what the question asks for

A 59-year-old female is admitted to the Emergency Department with a 30 minute history of central chest pain radiating to her left arm. An ECG shows ST elevation in leads II, III, aVF. Which coronary artery is most likely to be affected?

- ☐ Right coronary
- ☐ Left anterior descending
- ☐ Left main stem
- ☐ Left circumflex
- ☐ Anterior interventricular

Right coronary

74%

Left anterior descending

12%

Left main stem

3%

Left circumflex

8%

Anterior interventricular

3%

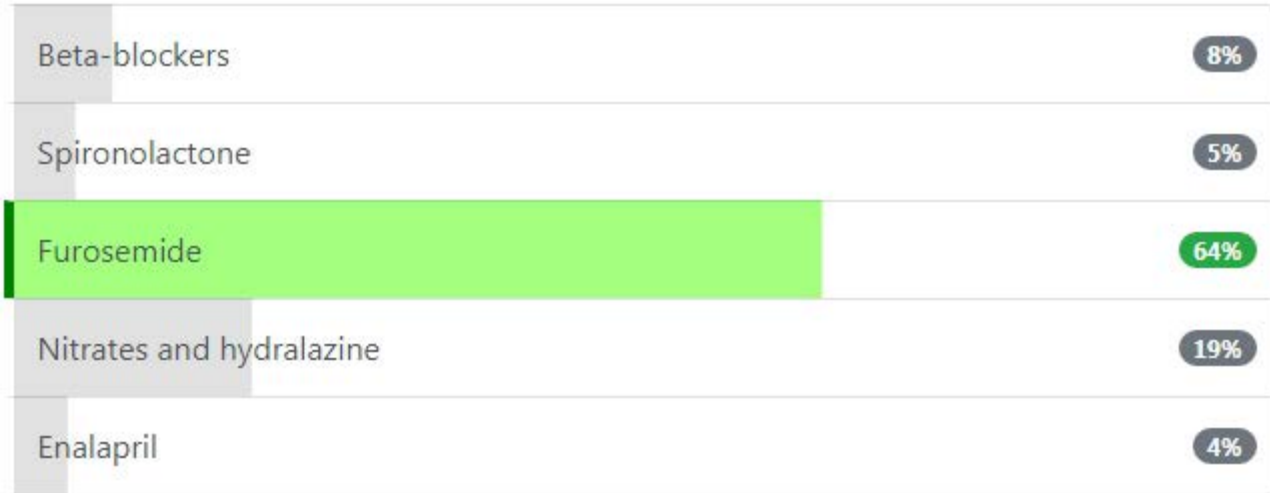
Inferior MI - right coronary artery lesion

Important for me

Less important

Which one of the following treatments have not been shown to improve mortality in patients with chronic heart failure?

- ☐ Beta-blockers
- ☐ Spironolactone
- ☐ Furosemide
- ☐ Nitrates and hydralazine
- ☐ Enalapril



Whilst useful in managing the symptoms of acute and chronic heart failure furosemide offers no prognostic benefits.

What is the mechanism of action of bivalirudin in acute coronary syndrome?

- ☐ Activates antithrombin III
- ☐ Inhibits the production of thromboxane A2
- ☐ Coronary vasodilator
- ☐ Reversible direct thrombin inhibitor
- ☐ Glycoprotein IIb/IIIa receptor antagonist

Activates antithrombin III

7%

Inhibits the production of thromboxane A₂

5%

Coronary vasodilator

7%

Reversible direct thrombin inhibitor

59%

Glycoprotein IIb/IIIa receptor antagonist

21%

A 54-year-old man is diagnosed with type 2 diabetes mellitus. A decision is made to start simvastatin 40mg. What is the ideal time to advise patients to take this medication?

- ☐ After breakfast
- ☐ Last thing in the evening
- ☐ After evening meal
- ☐ Just before evening meal
- ☐ First thing in the morning

After breakfast

3%

Last thing in the evening

74%

After evening meal

16%

Just before evening meal

4%

First thing in the morning

3%

Taking simvastatin at night improves efficacy

Dr Assem

An elderly patient with a history of atrial fibrillation develops torsades de pointes shortly after being started on sotalol. What effect does sotalol have on the cardiac cell membrane to make this more likely?

- ☒ Blockage of sodium channels
- ☐ Opening of potassium channels
- ☐ Blockage of potassium channels
- ☐ Opening of calcium channels
- ☐ Opening of sodium channels

Blockage of sodium channels

14%

Opening of potassium channels

13%

Blockage of potassium channels

63%

Opening of calcium channels

6%

Opening of sodium channels

4%

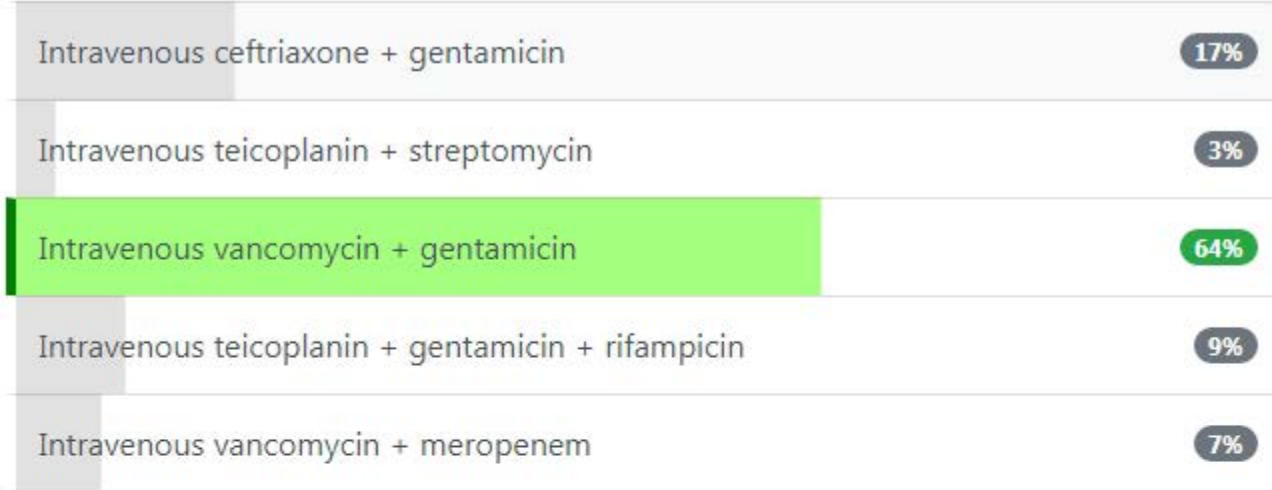
Long QT syndrome - usually due to loss-of-function/blockage of K⁺ channels

Important for me Less important

This patient is likely to have developed torsades de pointes secondary to a prolonged QT interval.

A 70-year-old female presents to the Emergency Department (ED) with fever, tachycardia and hypotension. She has no significant past medical history. On examination, there is a loud systolic murmur in the mitral region which was not documented in an attendance to the ED the previous month. She reports previous rash and lip swelling with penicillin. Which of the following empirical antibiotic therapies is the most appropriate?

- ☐ Intravenous ceftriaxone + gentamicin
- ☐ Intravenous teicoplanin + streptomycin
- ☐ Intravenous vancomycin + gentamicin
- ☐ Intravenous teicoplanin + gentamicin + rifampicin
- ☐ Intravenous vancomycin + meropenem



This patient has presented with severe sepsis as evidenced by the fever, tachycardia, and hypotension. The question states that she has no significant past medical history, so it can be assumed that she has native valves and is not at increased risk of pseudomonal or enterococcal infections.

Current guidelines suggest that presenting with severe sepsis increases the probability that the causative organism is *S. aureus*, and therefore the treatment regimen needs to cover MRSA. The recommended treatment for this is vancomycin + low-dose gentamicin. This is of course safe to use in penicillin allergy.

Which one of the following statements regarding catecholaminergic polymorphic ventricular tachycardia (CPVT) is correct?

- ☐ Resting ECG typically shows T wave inversion in leads V1-V3
- ☐ Beta-blockers are contraindicated in patients with CPVT
- ☐ Is associated with cleft palate
- ☐ In the majority of cases is due to a defect in the potassium channel
- ☐ Symptoms generally develop before the age of 20 years

Resting ECG typically shows T wave inversion in leads V1-V3

14%

Beta-blockers are contraindicated in patients with CPVT

17%

Is associated with cleft palate

7%

In the majority of cases is due to a defect in the potassium channel

25%

Symptoms generally develop before the age of 20 years

37%

Dr. Assef

A 57-year-old man with NYHA class III heart failure is currently treated with furosemide and ramipril. What is the most suitable beta-blocker to add to improve his long-term prognosis?

☐ Acebutolol

☐ Labetalol

☐ Bisoprolol

☐ Sotalol

☐ Esmolol



Both carvedilol and bisoprolol have been shown to reduce mortality in stable heart failure. The other beta-blockers have no evidence base to support their use

A young man suddenly collapses outside his home. He is found to be in cardiac arrest and passes away in hospital. He is diagnosed posthumously with arrhythmogenic right ventricular cardiomyopathy.

What changes would this condition cause in the heart?

- ☐ Myocardium replaced by fatty and fibrofatty tissue
- ☐ Asymmetrical thickening of the ventricle and septum
- ☐ Hypertrophy of the left ventricle
- ☐ Transient apical ballooning of the myocardium
- ☐ Poor diastolic function but normal systolic function

Myocardium replaced by fatty and fibrofatty tissue

69%

Asymmetrical thickening of the ventricle and septum

17%

Hypertrophy of the left ventricle

5%

Transient apical ballooning of the myocardium

5%

Poor diastolic function but normal systolic function

4%

Arrhythmogenic right ventricular cardiomyopathy is characterised by right ventricular myocardium replaced by fatty and fibrofatty tissue

Important for me Less important

Asymmetrical thickening of the septum is associated with hypertrophic obstructive cardiomyopathy, the leading cause of sudden cardiac death

Left ventricular hypertrophy has a number of causes which include hypertension, aortic valve stenosis, hypertrophic cardiomyopathy and athletic training.

Arrhythmogenic right ventricular cardiomyopathy in late stages can cause dilation of the ventricles, however, this would not be transient. A transient ballooning would point to a diagnosis of Takotsubo cardiomyopathy which is triggered by acute stress.

Poor diastolic function but normal systolic function is a finding in restrictive cardiomyopathy

Dr Assem

A 34-year-old woman has emergency surgery after a ruptured ectopic pregnancy. She is recovering in ITU when her blood pressure suddenly rises to 210/170 mmHg and her heart rate to 120 bpm. Which of her regular medications is most likely to have caused the hypertensive crisis?

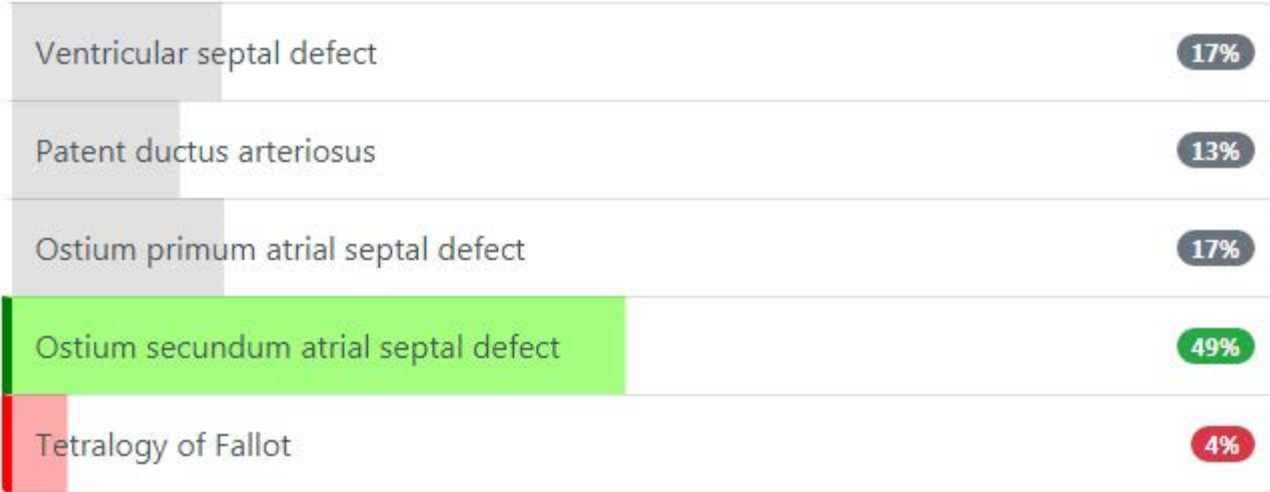
- ☐ Clomifene
- ☐ Esomeprazole
- ☐ Phenezine
- ☐ Sertraline
- ☐ Levonorgestrel



Phenelzine is a monoamine oxidase inhibitor (MAOI), a class of drugs rarely used now in part due to the risk of hypertensive crises. In emergency settings like this scenario, there is a substantial elevation of that risk due to interactions with vasopressors used to treat hypotension.

A 25-year-old female is found to have a left hemiparesis following a deep vein thrombosis. An ECG shows RBBB with right axis deviation. What is the most likely underlying diagnosis?

- ☐ Ventricular septal defect
- ☐ Patent ductus arteriosus
- ☐ Ostium primum atrial septal defect
- ☐ Ostium secundum atrial septal defect
- ☐ Tetralogy of Fallot



The ostium secundum in this patient has allowed passage of an embolus from the right-sided circulation to the left causing a stroke

A 55-year-old man who has a history of ischaemic heart disease presents with myalgia. His long-term medications include aspirin, simvastatin and atenolol. Given his statin use a creatine kinase is measured and reported as follows:

Creatine kinase	1,420 u/l (< 190 u/l)
-----------------	-----------------------

His problems seem to have followed the prescription of a new medication. Which one of the following is most likely to have caused the elevation in creatine kinase?

- ☐ Rifampicin
- ☐ Felodipine
- ☐ Clarithromycin
- ☐ Ciprofloxacin
- ☐ Amitriptyline

Rifampicin

14%

Felodipine

6%

Clarithromycin

50%

Ciprofloxacin

22%

Amitriptyline

8%

Statins + erythromycin/clarithromycin - an important and common interaction

Important for me Less important

This patient has developed statin-induced myopathy secondary to clarithromycin, which is a known inhibitor of the CYP3A4 enzyme system.

Whilst ciprofloxacin is a 'P450 inhibitor' it affects a different enzyme system and does not produce a clinically significant interaction. Also, in the BNF the interaction is not considered significant, unlike the interaction with macrolides.

Dr Assef

A 72-year-old man who has a history of ischaemic heart disease and left ventricular dysfunction is admitted with dyspnoea. He has not taken his diuretics for three days as he ran out. On examination you note bilateral crackles to the midzones and a respiratory rate of 30/min. Which other clinical finding is most specific with this presentation?

- ☐ Bisferiens pulse
- ☐ Wide pulse pressure
- ☐ Warm peripheries
- ☐ Pulsus alternans
- ☐ Fourth heart sound (S4)

Bisferiens pulse

13%

Wide pulse pressure

8%

Warm peripheries

3%

Pulsus alternans

49%

Fourth heart sound (S4)

28%

Pulsus alternans - seen in left ventricular failure

Important for me Less important

A 71-year-old man with a four-month history of exertional chest pain is reviewed. The pain typically comes on when he is walking up a hill, is centrally located and radiates to the left arm. It then settles with rest after about 2-3 minutes. Clinical examination and a resting 12 lead ECG are normal. Following NICE guidelines, what is the most appropriate diagnostic strategy?

- ☐ CT coronary angiography
- ☐ Manage as angina, no further diagnostic tests required
- ☐ Exercise tolerance test
- ☐ MPS with SPECT
- ☐ Invasive coronary angiography

CT coronary angiography

47%

Manage as angina, no further diagnostic tests required

14%

Exercise tolerance test

25%

MPS with SPECT

7%

Invasive coronary angiography

7%

A 66-year-old man presents with shortness-of-breath on exertion. On examination his blood pressure is 128/76 mmHg, pulse 78 / min and regular. Auscultation of his chest reveals an early diastolic murmur. Which one of the following conditions is most associated with this kind of murmur?

- ☐ Atrial septal defect
- ☐ Mitral stenosis
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Aortic regurgitation
- ☐ Mitral regurgitation

Atrial septal defect

4%

Mitral stenosis

22%

Hypertrophic obstructive cardiomyopathy

4%

Aortic regurgitation

61%

Mitral regurgitation

9%

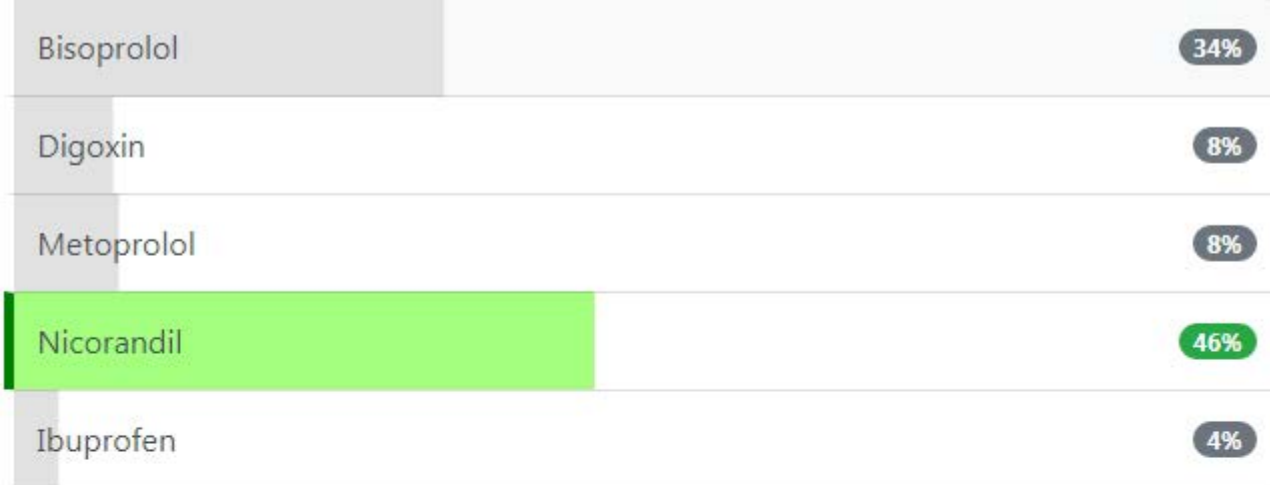
Aortic regurgitation - early diastolic murmur, high-pitched and 'blowing' in character

Important for me Less important

You are seeing John, a 50-year-old man who is complaining of central constricting chest pain. Walking up the stairs triggers the pain. The pain goes away with resting. He experiences some shortness of breath but denies any syncope or palpitations. He suffers from hypertension and diabetes. He takes verapamil for migraine prophylaxis. His other medications include GTN spray, aspirin, atorvastatin, Ramipril and metformin. On examination, his rhythm seems to be irregular. There is no murmur on auscultation of the heart. There is no tenderness on chest wall palpation.

He is asking for a medication that would be helpful to prevent the chest pain from occurring. What is the most appropriate treatment?

- ☐ Bisoprolol
- ☐ Digoxin
- ☐ Metoprolol
- ☐ Nicorandil
- ☐ Ibuprofen



Beta-blockers e.g. bisoprolol should not be used with verapamil due to the risk of bradycardia, heart block, congestive heart failure

Important for me Less important

This is a typical angina history. Beta-blocker is a first line Angina prophylaxis. However, this man is taking verapamil for his migraine. Verapamil should not be used with beta blocker due to the risk of bradycardia, heart block or even congestive cardiac failure. Therefore, bisoprolol and metoprolol are incorrect answers. Ibuprofen and digoxin do not reduce the frequency of angina. Therefore, the next line for prophylaxis of angina is Nicorandil.

You review a 24-year-old woman with a history of asthma in the Emergency Department. She has been admitted with acute shortness of breath associated with tongue tingling and an urticarial rash after eating a meal containing shellfish. Her symptoms settle with nebulised salbutamol and intravenous hydrocortisone. What is the most useful test to establish whether this episode was due to anaphylaxis?

- ☐ Serum tryptase
- ☐ Serum IgE
- ☐ Plasma histamine
- ☐ Eosinophil count
- ☐ C-reactive protein

Serum tryptase

60%

Serum IgE

21%

Plasma histamine

9%

Eosinophil count

8%

C-reactive protein

2%

Anaphylaxis - serum tryptase levels rise following an acute episode

Important for me

Less important

Serum tryptase levels may remain elevated for up to 12 hours following an acute episode of anaphylaxis.

What is the initial physiological response to the Valsalva manoeuvre?

- ☐ Reduction in cardiac output
- ☐ Reduced mean arterial blood pressure
- ☐ Reduced heart rate
- ☐ Reduced venous return
- ☐ Reduction in intrathoracic pressure

Reduction in cardiac output

10%

Reduced mean arterial blood pressure

7%

Reduced heart rate

22%

Reduced venous return

50%

Reduction in intrathoracic pressure

12%

You have been asked to supervise an exercise tolerance test (ETT) for a 70-year-old patient with suspected ischaemic heart disease who has been experiencing exertional chest pain. He has had no recent episodes of severe chest pain and feels well today. Before starting the test his pulse is 84/min and blood pressure is 130/80 mmHg. Once the ETT has begun, which one of the following is the strongest indication for stopping the test?

- ☐ Blood pressure of 105/70 mmHg
- ☐ Heart rate of 130/min
- ☐ Systolic blood pressure of 215 mmHg
- ☐ ST depression of 2mm
- ☐ ST elevation of 1mm

Blood pressure of 105/70 mmHg

33%

Heart rate of 130/min

6%

Systolic blood pressure of 215 mmHg

26%

ST depression of 2mm

23%

ST elevation of 1mm

13%

A 60-year-old heavy goods vehicle (HGV) driver with a one month history of ankle swelling and orthopnoea presents to clinic for review. His departmental echocardiogram shows he has a left ventricular ejection fraction (LVEF) of 35%. Which of the following statements most accurately counsels this patient as regard to his driving?

- ☐ An LVEF of $< 40\%$ bars him from driving a lorry, even if he becomes asymptomatic with treatment
- ☐ His symptoms bar him from driving both a lorry and a car
- ☐ The implantation of a CRT-defibrillator would allow him to drive in 6 weeks' time
- ☐ He does not need to inform the DVLA
- ☐ An LVEF of $< 40\%$ bars him from driving a lorry only if associated with incapacity

An LVEF of $< 40\%$ bars him from driving a lorry, even if he becomes asymptomatic with treatment

40%

His symptoms bar him from driving both a lorry and a car

7%

The implantation of a CRT-defibrillator would allow him to drive in 6 weeks' time

9%

He does not need to inform the DVLA

16%

An LVEF of $< 40\%$ bars him from driving a lorry only if associated with incapacity

27%

Heart failure is very commonly encountered in clinical practice. DVLA guidance for Group 2 entitlements (HGVs and buses) is much more strict than Group 1 entitlements (cars and vans).

Symptomatic heart failure will lead to revocation of a Group 2 licence, regardless of whether the symptoms lead to incapacity. If a patient on treatment becomes asymptomatic, then they may be relicensed only if their LVEF is $\geq 40\%$.

For Group 1 entitlements, the DVLA does not need to be informed of symptomatic heart failure if it does not lead to distracting or incapacitating symptoms.

Any form of defibrillator is a bar to a Group 2 entitlement.

A 75-year-old female presents diaphoretic and distressed with new onset sternal chest pain radiating through to the back. She has a past history of hypertension on lercanidipine. On examination her blood pressure is 190/70 mmHg and there is an early diastolic murmur heard best at the left sternal edge. Her ECG is unremarkable. What is the next best course of action?

☐ Aspirin/clopidogrel/IV heparin

☐ Cardiac catheterisation

☐ CT chest with contrast

☐ Urgent echocardiogram

☐ Thrombolysis

Cardiac catheterisation	7%
CT chest with contrast	54%
Urgent echocardiogram	25%
Thrombolysis	4%

This is a classic example of an aortic dissection causing aortic regurgitation. The best investigation is going to be a CT chest with IV contrast because the IV contrast will be able to best demonstrate the size and extent of the false lumen.

The chest X-ray may show a widened mediastinum, but unfortunately it is not a sensitive or specific investigation as 20% of patients present with normal chest X-ray and there are many causes of a widened mediastinum. However, the chest X-ray is a useful first line investigation for this condition because of how readily available it is, and useful for ruling out many other conditions. Looking for a separation of the intimal calcification from the outer aortic soft tissue border by 10 mm is an indication of the presence of a dissection. The CT chest with contrast will provide the most amount of information by far, and can demonstrate the extent of the dissection.

An echo is a reasonable investigation, but will not demonstrate the extent of the vessel lesion, for which a CT of the chest will demonstrate the lesion much better.

The next step is for surgery after the initial CT chest with contrast is complete.

Which one of the following statements regarding arrhythmogenic right ventricular cardiomyopathy is correct?

- ☐ Inherited in an autosomal recessive pattern
- ☐ It is now the most common cause of sudden cardiac death in the UK
- ☐ All patients should have an implantable cardioverter defibrillator fitted
- ☐ It is characterised by fibrofatty infiltration of the right ventricular myocardium
- ☐ Naxos disease is the association of arrhythmogenic right ventricular cardiomyopathy with deafness

Inherited in an autosomal recessive pattern

6%

It is now the most common cause of sudden cardiac death in the UK

4%

All patients should have an implantable cardioverter defibrillator fitted

12%

It is characterised by fibrofatty infiltration of the right ventricular myocardium

71%

Naxos disease is the association of arrhythmogenic right ventricular cardiomyopathy with deafness

8%

Drug therapy is used in patients with well tolerated or non life-threatening ventricular arrhythmias.

An elderly man with aortic stenosis is assessed. Which one of the following would make the ejection systolic murmur quieter?

- ☐ Left ventricular systolic dysfunction
- ☐ Thyrotoxicosis
- ☐ Mixed aortic valve disease
- ☐ Expiration
- ☐ Anaemia

Left ventricular systolic dysfunction

48%

Thyrotoxicosis

3%

Mixed aortic valve disease

20%

Expiration

22%

Anaemia

7%

Left ventricular systolic dysfunction will result in a decreased flow-rate across the aortic valve and hence a quieter murmur.

Dr Assem

A 29-year-old woman is investigated for increasing dyspnoea and feeling generally weak and lethargic. Over the past few months, she has had five episodes of syncope, some of which occurred following exercise. There is no prior medical history of note although her grandmother died aged 44 years after suffering increasing shortness-of-breath and syncope. On examination her oxygen saturations are 98% on room air and the pulse is 78 / min. The second heart sound is loud but no murmurs are heard. Auscultation of the chest is unremarkable.

What is the most likely diagnosis?

- ☐ Pulmonary arterial hypertension
- ☐ Familial pulmonary stenosis
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Catecholaminergic polymorphic ventricular tachycardia
- ☐ Arrhythmogenic right ventricular dysplasia

Pulmonary arterial hypertension

36%

Familial pulmonary stenosis

8%

Hypertrophic obstructive cardiomyopathy

39%

Catecholaminergic polymorphic ventricular tachycardia

7%

Arrhythmogenic right ventricular dysplasia

10%

A 51-year-old female presents to the Emergency Department following an episode of transient right sided weakness lasting 10-15 minutes. Examination reveals the patient to be in atrial fibrillation. If the patient remains in chronic atrial fibrillation what is the most suitable form of anticoagulation?

- ☐ Aspirin
- ☐ Warfarin, target INR 2-3
- ☐ No anticoagulation
- ☐ Warfarin, target INR 3-4
- ☐ Warfarin, target INR 2-3 for six months then aspirin

Aspirin

5%

Warfarin, target INR 2-3

78%

No anticoagulation

4%

Warfarin, target INR 3-4

7%

Warfarin, target INR 2-3 for six months then aspirin

5%

The CHA₂DS₂-VASc for this patient is 3 - 2 for the transient ischaemic attack and 1 for being female. She should therefore be offered anticoagulation with warfarin.

Each one of the following is associated with right axis deviation on ECG, except:

- ☐ Right ventricular hypertrophy
- ☐ Pulmonary embolism
- ☐ Wolf-Parkinson-White syndrome with right-sided accessory pathway
- ☐ Chronic lung disease
- ☐ Left posterior hemiblock

Right ventricular hypertrophy

4%

Pulmonary embolism

3%

Wolf-Parkinson-White syndrome with right-sided accessory pathway

73%

Chronic lung disease

3%

Left posterior hemiblock

16%

Left axis deviation - Wolff-Parkinson-White syndrome (right-sided accessory pathway)

Important for me [Less important](#)

Wolff-Parkinson-White syndrome is associated with a short PR interval and a wide QRS complex with a slurred upstroke, termed a delta wave. Axis deviation depends on the position of the accessory pathway

Staphylococcus aureus

infection

18%

Culture negative endocarditis

11%

Streptococcus viridans

infection

62%

Low complement levels

5%

Prosthetic valve endocarditis

4%

Infective endocarditis - streptococcal infection carries a good prognosis

Important for me

Less important

A 72-year-old man is prescribed a dipyridamole in addition to aspirin following an ischaemic stroke. What is the mechanism of action of dipyridamole?

- ☐ Phosphodiesterase inhibitor
- ☐ Glycoprotein IIb/IIIa inhibitor
- ☐ Inhibits ADP binding to its platelet receptor
- ☐ Agonist of thromboxane synthase
- ☐ Irreversibly acetylating cyclooxygenase

Phosphodiesterase inhibitor

35%

Glycoprotein IIb/IIIa inhibitor

12%

Inhibits ADP binding to its platelet receptor

32%

Agonist of thromboxane synthase

11%

Irreversibly acetylating cyclooxygenase

10%

Dipyridamole is a non-specific phosphodiesterase inhibitor and decreases cellular uptake of adenosine

Important for me Less important

Dipyridamole is generally described as a non-specific phosphodiesterase (PDE) inhibitor but it is known to be particularly active against PDE5 (like sildenafil) and PDE6.

A 65-year-old man with no significant past medical history is admitted to the Emergency Department. His ECG is consistent with an anterior myocardial infarction. Unfortunately he develops cardiac arrest shortly after arriving in the department. What is the most common cause of death in patients following a myocardial infarction?

- ☐ Pulmonary embolism
- ☐ Cardiogenic shock
- ☐ Papillary muscle rupture
- ☐ Ventricular fibrillation
- ☐ Complete heart block

Pulmonary embolism

3%

Cardiogenic shock

14%

Papillary muscle rupture

11%

Ventricular fibrillation

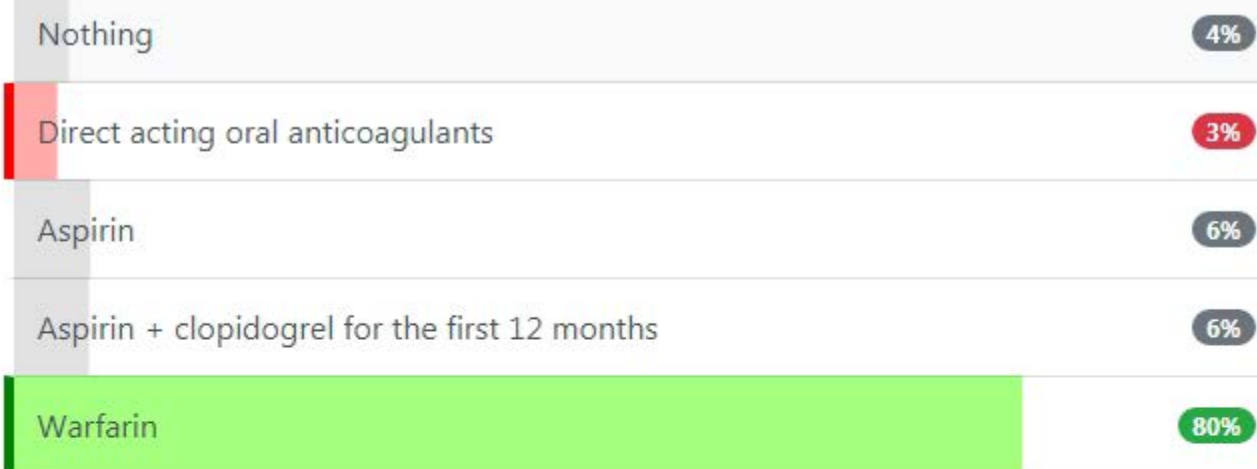
65%

Complete heart block

7%

A 62-year-old man who had a mechanical mitral valve replacement four years ago is reviewed. What long term antithrombotic therapy is he likely to be taking?

- ☐ Nothing
- ☐ Direct acting oral anticoagulants
- ☐ Aspirin
- ☐ Aspirin + clopidogrel for the first 12 months
- ☐ Warfarin



Prosthetic heart valves - antithrombotic therapy:

- bioprosthetic: aspirin
- mechanical: warfarin + aspirin

Important for me Less important

Following the 2017 European Society of Cardiology guidelines, aspirin is only normally given in addition if there is an additional indication, e.g. ischaemic heart disease.

Direct acting oral anticoagulants are not used in patients with a mechanical heart valve.

A 70-year-old woman is prescribed bumetanide for congestive cardiac failure. Where is the site of action of bumetanide?

- ☐ Descending loop of Henle
- ☐ Macula densa
- ☐ Ascending loop of Henle
- ☐ Distal collecting duct
- ☐ Proximal collecting duct

Descending loop of Henle

13%

Macula densa

3%

Ascending loop of Henle

57%

Distal collecting duct

17%

Proximal collecting duct

11%

Furosemide - inhibits the Na-K-Cl cotransporter in the thick ascending limb of the loop of Henle

Important for me [Less important](#)

Bumetanide, like furosemide, is a loop diuretic.

Which one of the following clotting factors is not affected by warfarin?

☐ Factor II

☐ Factor VII

☐ Factor XII

☐ Factor IX

☐ Factor X



Warfarin - clotting factors affected mnemonic - 1972 (**10, 9, 7, 2**)

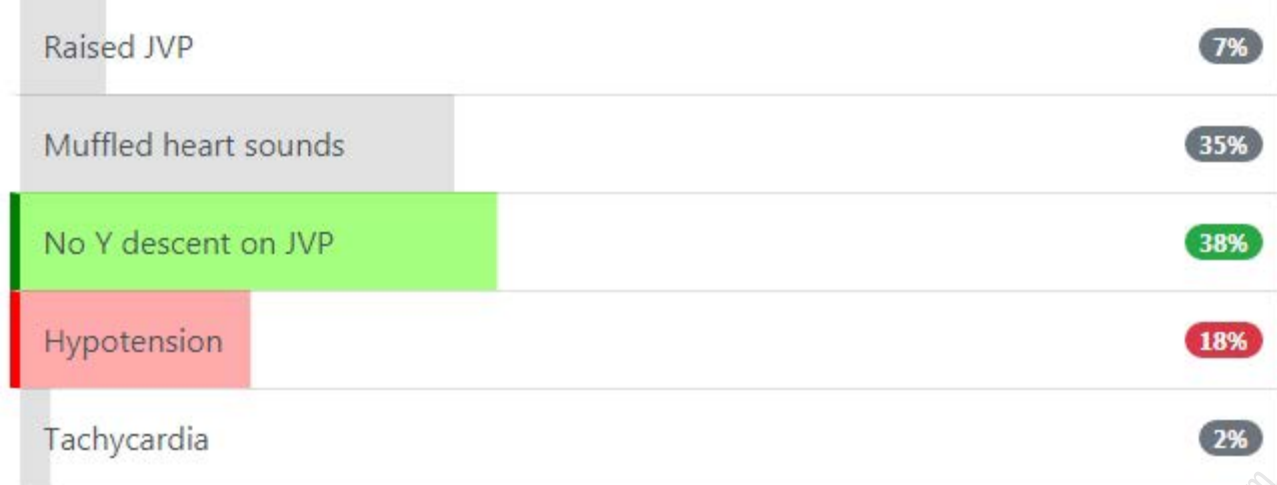
Important for me Less important

Factor XII is not affected by warfarin

Dr. Assem

Which one of the following features would indicate cardiac tamponade rather than constrictive pericarditis?

- ☐ Raised JVP
- ☐ Muffled heart sounds
- ☐ No Y descent on JVP
- ☐ Hypotension
- ☐ Tachycardia



In cardiac tamponade there is characteristically no Y descent on the JVP. The other four features are seen in both cardiac tamponade and constrictive pericarditis

In patients with atrial fibrillation (AF), which one of the following factors would make a rate control strategy, rather than rhythm control, more suitable?

- ☐ Congestive heart failure
- ☐ AF secondary to a corrected precipitant
- ☐ Symptomatic
- ☐ Age > 65 years
- ☐ First presentation

Congestive heart failure

14%

AF secondary to a corrected precipitant

8%

Symptomatic

6%

Age > 65 years

66%

First presentation

7%

Which one of the following patients should not automatically be prescribed a statin in the absence of any contraindication?

- ☐ A 51-year-old man who had a myocardial infarction 4 years ago and is now asymptomatic
- ☐ A 57-year-old female smoker with a 10-year cardiovascular risk of 23%
- ☐ A 53-year-old man with intermittent claudication
- ☐ A 62-year-old man who had a transient ischaemic attack 10 months ago
- ☐ A 57-year-old man with well controlled diabetes mellitus type 2 with a 10-year cardiovascular risk of 8%

A 51-year-old man who had a myocardial infarction 4 years ago and is now asymptomatic

8%

A 57-year-old female smoker with a 10-year cardiovascular risk of 23%

8%

A 53-year-old man with intermittent claudication

20%

A 62-year-old man who had a transient ischaemic attack 10 months ago

7%

A 57-year-old man with well controlled diabetes mellitus type 2 with a 10-year cardiovascular risk of 8%

56%

Dr. Asem

Which one of the following drugs is most likely to cause a prolonged QT interval?

☐ Metoclopramide

☐ Verapamil

☐ Ceftriaxone

☐ Sotalol

☐ Digoxin

Metoclopramide

14%

Verapamil

9%

Ceftriaxone

3%

Sotalol

64%

Digoxin

9%

Sotalol is known to cause long QT syndrome

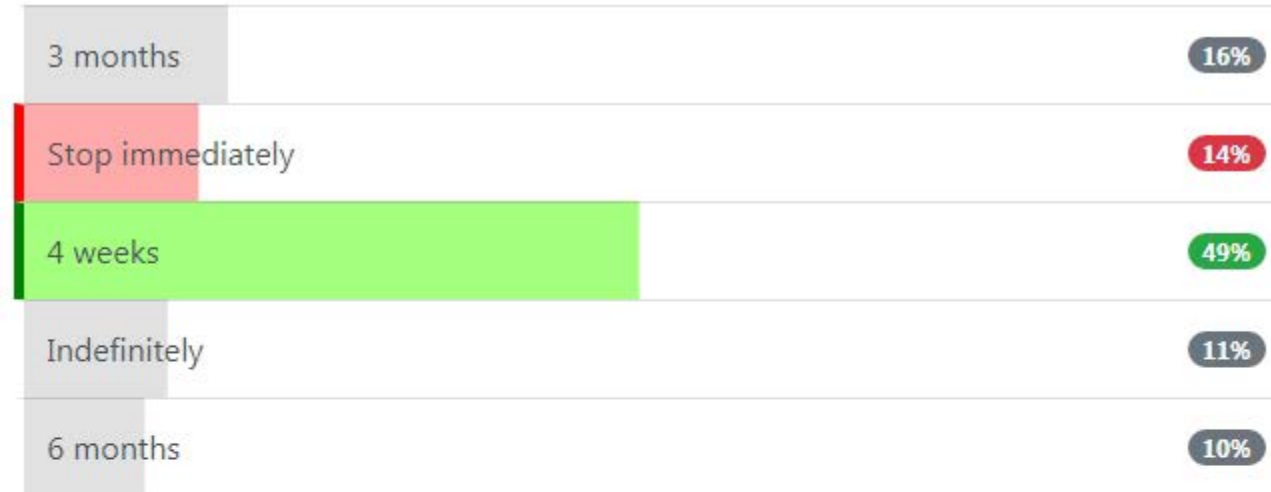
Important for me

Less important

A 35-year-old female has paroxysmal atrial fibrillation and was successfully treated with DC cardioversion 1 week ago. She is now resultantly on warfarin. A subsequent post-cardioversion echocardiogram shows no structural abnormalities.

How long should the warfarin be continued?

- ☐ 3 months
- ☐ Stop immediately
- ☐ 4 weeks
- ☐ Indefinitely
- ☐ 6 months



It is recommended warfarin be continued for at least 4 weeks after successful cardioversion. If there is structural abnormalities or the atrial fibrillation is likely to re-occur then long term anti-coagulation is recommended.

BMJ best practice: <http://bestpractice.bmj.com/best-practice/monograph/3/treatment/step-by-step.html>

Resus Council UK peri-arrest arrhythmia (page 7) :
<https://www.resus.org.uk/EasySiteWeb/GatewayLink.aspx?alId=808>

A 61-year-old man with peripheral arterial disease is prescribed simvastatin. What is the most appropriate blood test monitoring?

- ☐ LFTs + creatinine kinase at baseline, 1-3 months and at intervals of 6 months for 1 year
- ☐ LFTs at baseline and every 3 months for first year
- ☐ Routine blood tests not recommended
- ☐ LFTs at baseline and annually
- ☐ LFTs at baseline, 3 months and 12 months

LFTs + creatinine kinase at baseline, 1-3 months and at intervals of 6 months for 1 year

24%

LFTs at baseline and every 3 months for first year

10%

Routine blood tests not recommended

4%

LFTs at baseline and annually

5%

LFTs at baseline, 3 months and 12 months

57%

A fasting lipid profile may also be checked during monitoring to assess response to treatment.

Symptom-limited treadmill exercise testing is often done before discharge after a STEMI. Which of the following parameters at exercise testing most strongly indicates a good prognosis with medical treatment?

- ☐ Absence of ST depression
- ☐ Percent (%) predicted maximal heart rate achieved
- ☐ Absence of ventricular arrhythmia
- ☐ Absence of chest pain
- ☐ Above average exercise capacity

Absence of ST depression

16%

Percent (%) predicted maximal heart rate achieved

24%

Absence of ventricular arrhythmia

8%

Absence of chest pain

23%

Above average exercise capacity

30%

Essentially, the question asks: 'Which of the following is the best predictor of mortality post-STEMI?'

Above average exercise capacity performed before discharge is associated with a good prognosis after a STEMI. Exercise capacity has been repeatedly shown in studies of exercise testing to be the strongest predictor of mortality and cardiovascular events, particularly in elderly persons.

A 72-year-old male is admitted to the Emergency Room following a collapse at church. ECG reveals dissociation between the P and QRS complexes with a rate of 40 / minute. Which one of the following clinical findings may also be found?

- ☐ Loud S1
- ☐ Narrow pulse pressure
- ☐ Giant v waveforms in the JVP
- ☐ Variable intensity of S1
- ☐ Soft S2

Loud S1

5%

Narrow pulse pressure

16%

Giant v waveforms in the JVP

29%

Variable intensity of S1

43%

Soft S2

7%

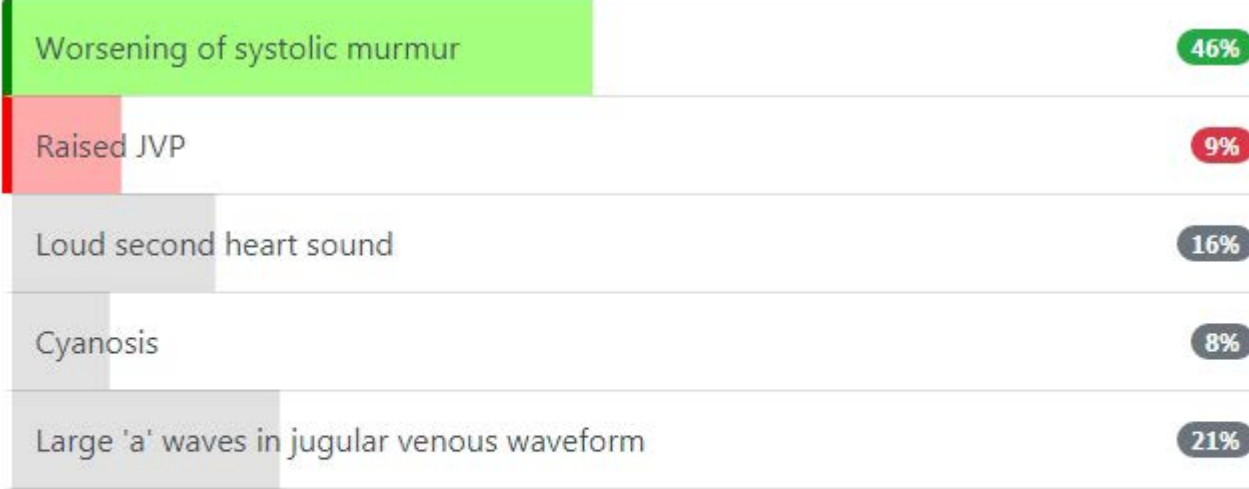
Complete heart block causes a variable intensity of S1

Important for me

Less important

Which of the following signs is not associated with the development of Eisenmenger's syndrome in a patient with a ventricular septal defect?

- ☐ Worsening of systolic murmur
- ☐ Raised JVP
- ☐ Loud second heart sound
- ☐ Cyanosis
- ☐ Large 'a' waves in jugular venous waveform



Clinical Sign	Percentage
Worsening of systolic murmur	46%
Raised JVP	9%
Loud second heart sound	16%
Cyanosis	8%
Large 'a' waves in jugular venous waveform	21%

Worsening of systolic murmur

46%

Raised JVP

9%

Loud second heart sound

16%

Cyanosis

8%

Large 'a' waves in jugular venous waveform

21%

Eisenmenger's syndrome is characterised by the reversal of the left-right shunt due to pulmonary hypertension. The original murmur may disappear once Eisenmenger's syndrome develops

A 51-year-old male represents with chest pain, eighteen days after he was diagnosed with a non-ST elevation myocardial infarction. It is severe, central chest pain with radiations to the left shoulder and worse with deep inspiration. The pain woke him from sleep at 03:00 and has improved slightly after getting up out of bed. Findings on examination include reduced air entry to both bases coupled with fine basal crepitations. Observations show:

Heart rate	105bpm
Blood pressure	130/78mmHg
Respiratory rate	22bpm
Temperature	37.8 celsius
Oxygen saturations	97%

An initial ECG shows diffuse saddle-shaped ST elevation. An echocardiogram shows a small rim of fluid outside the pericardium. What is the most likely diagnosis?

- ☐ Second myocardial infarction
 - ☐ Pulmonary embolism
 - ☐ Dressler's syndrome
 - ☐ Costochondritis
 - ☐ Unstable angina
- Dr Assem

Second myocardial infarction	2%
Pulmonary embolism	4%
Dressler's syndrome	91%
Costochondritis	2%
Unstable angina	2%

The correct answer is Dressler's syndrome given the recent history of MI, description of pain (pleuritic, left shoulder radiation, worse lying down), low-grade temperature, ECG changes and pericardial effusion.

It is treated with NSAIDs preferably or a prolonged course of colchicine or steroids.

What does troponin T bind to?

- ☐ Tropomyosin
- ☐ Actin in thin myofilaments
- ☐ Protein kinase C inhibitors
- ☐ Calcium ions
- ☐ T-tubule membrane wall



Component	Percentage
Tropomyosin	54%
Actin in thin myofilaments	30%
Protein kinase C inhibitors	4%
Calcium ions	5%
T-tubule membrane wall	7%

Tropomyosin

54%

Actin in thin myofilaments

30%

Protein kinase C inhibitors

4%

Calcium ions

5%

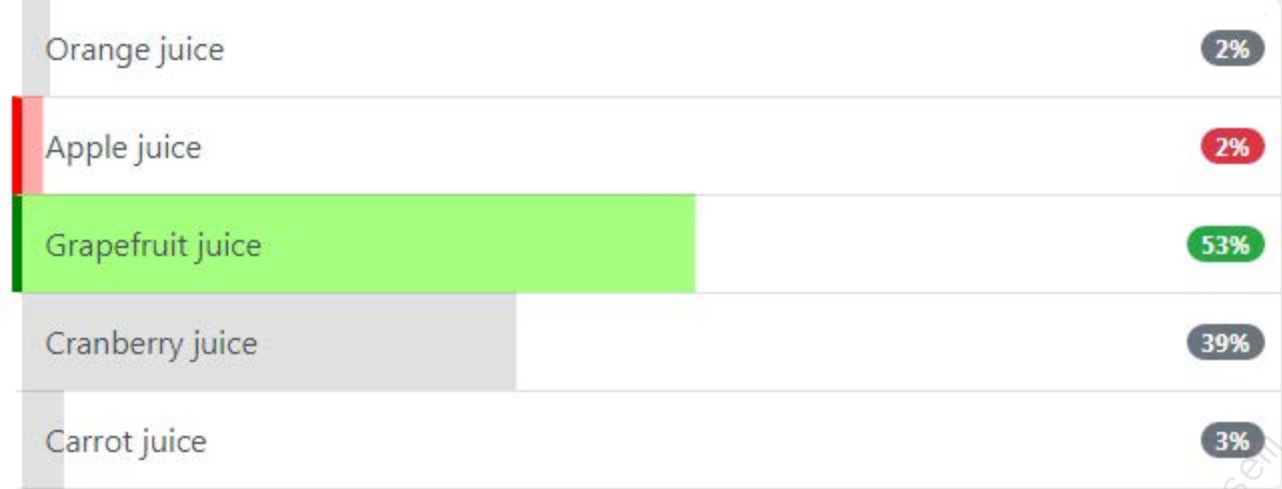
T-tubule membrane wall

7%

Tropomyosin is a protein which regulates actin. It associates with actin in muscle fibres and regulates muscle contraction by regulating the binding of myosin.

A 67-year-old female is prescribed simvastatin for hyperlipidaemia. Which one of the following is most likely to interact with her medication?

- ☐ Orange juice
- ☐ Apple juice
- ☐ Grapefruit juice
- ☐ Cranberry juice
- ☐ Carrot juice



Grapefruit juice is a potent inhibitor of the cytochrome P450 enzyme CYP3A4

A 23-year-old woman presents to the Emergency Department with a friend from work. Around 30 minutes ago she developed a 'fluttering' in her chest. She reports feeling 'a bit faint' but denies any chest pain or shortness of breath. An ECG shows a regular tachycardia of 166 bpm with a QRS duration of 0.11s. Blood pressure is 102/68 mmHg and oxygen saturations are 99% on room air. What is the most appropriate management?

- ☐ Intravenous magnesium sulphate
- ☐ Direct current cardioversion
- ☐ Intravenous adenosine 3mg
- ☐ Intravenous adenosine 6mg
- ☐ Carotid sinus massage

Intravenous magnesium sulphate

4%

Direct current cardioversion

8%

Intravenous adenosine 3mg

4%

Intravenous adenosine 6mg

14%

Carotid sinus massage

70%

The first-line management of supraventricular tachycardia are vagal manoeuvres such as carotid sinus massage. Only if these fail should adenosine be given. There are no indications for direct current cardioversion as per the ALS guidelines.

A 66-year-old male with a 75 pack year history of smoking is admitted with a 2 hour history of central crushing chest pain radiating to his jaw. ECG revealed ST depression in II, III, aVF. 6 hour troponin I was 450ng/L. Grace score revealed 6 month mortality risk of 9%. The patient was started on Tirofiban whilst waiting for angiography.

What is the mechanism of action of Tirofiban?

- ☐ ADP receptor antagonist
- ☐ Factor Xa inhibitor
- ☐ GpIIb/IIIa inhibitor
- ☐ Cox inhibitor
- ☐ Direct thrombin inhibitor

Factor Xa inhibitor

6%

GpIIb/IIIa inhibitor

74%

Cox inhibitor

2%

Direct thrombin inhibitor

10%

This 66-year-old male has presented with a non ST elevated myocardial infarction. Detailed management of NSTEMI's vary from trust to trust, but often involve performing a 6 month mortality score (GRACE) to guide treatment. If your score is greater than intermediate risk ($>3\%$) a glycoprotein inhibitor is started prior to angiography within 96 hours.

Grace score:

Lowest ($<1.5\%$)	Low (1.5-3.0%)	Intermediate (3-6%)	High (6-9%)	Highest($>9\%$)
Aspirin 12 months	Aspirin + Clopidogrel for 12 months & outpatient perfusion/stress imaging	Glycoprotein inhibitor & angiography within 96 hours	Glycoprotein inhibitor & angiography within 96 hours	Glycoprotein inhibitor & angiography within 96 hours

Which part of the jugular venous waveform may be exaggerated in tricuspid regurgitation?

☐ x descent

☐ v wave

☐ y descent

☐ a wave

☐ c wave

x descent

7%

v wave

47%

y descent

16%

a wave

14%

c wave

16%

JVP: giant v waves in tricuspid regurgitation

Important for me ~~Less important~~

Dr Assem

You review a 24-year-old woman who has recently been diagnosed as having long QT syndrome type I (LQTS1). You are discussing the need to avoid certain drugs and other aggravating factors. Which one of the following should be avoided if possible?

- ☐ Methotrexate
- ☐ Sertraline
- ☐ Grapefruit juice
- ☐ Carbamazepine
- ☐ Doxycycline

Methotrexate

4%

Sertraline

59%

Grapefruit juice

11%

Carbamazepine

15%

Doxycycline

11%

Dr Assef

A 29-year-old man, with no past history, presents with a left middle cerebral artery (MCA) territory stroke. He reports trouble sleeping and laying flat at night that began after a flu-like illness 3 months ago, and reports some exertional dyspnoea. His left ventricular ejection fraction is 15% on a cardiac echocardiogram. Which of the following is the most likely factor which contributed to the cause of his stroke?

- ☐ Epstein-Barr virus
- ☐ Stenosed carotid arteries
- ☐ Coxsackie virus
- ☐ Influenza virus
- ☐ Parvovirus B19

Influenza virus

4%

Parvovirus B19

32%

The underlying diagnosis is a viral myocarditis precipitating a dilated cardiomyopathy and causing a cardioembolic stroke. Previously, the enteroviruses (including coxsackievirus) were the most common identified viruses in the 1990's. Currently, parvovirus B-19 and human herpes virus 6 are considered the most common causes of viral myocarditis. The echo may show reduced left ventricular ejection fraction, myocardial dyssynchrony (myocardial segments contract at different points in time), thinning of the left ventricular wall and a dilated left ventricle. Trouble sleeping and laying flat at night and the exertional dyspnoea after a flu-like illness are key features suggestive of a viral myocarditis.

The cause of the stroke is cardioembolic and not from carotid stenosis.

Viral Causes of Myocarditis:

- Parvovirus B19
- Human herpes virus 6
- Coxsackie B virus
- Adenovirus
- Hepatitis C
- Cytomegalovirus
- Echovirus
- Influenza virus
- Epstein-Barr virus

A 52-year-old female with an acute presentation of chest pain undergoes an angiogram to look for coronary artery disease. During the procedure, she has a run of ventricular tachycardia which self-resolves.

The report of the angiogram revealed normal coronary arteries. All other cardiac investigations were normal. What is the most likely follow-up plan?

- ☐ Insert internal cardiac defibrillator
- ☐ Perform an exercise stress test
- ☐ Discharge from cardiology when medically fit
- ☐ Commence amiodarone
- ☐ Repeat the angiogram

Insert internal cardiac defibrillator

19%

Perform an exercise stress test

22%

Discharge from cardiology when medically fit

49%

Commence amiodarone

8%

Repeat the angiogram

3%

An uncommon complication of a coronary angiogram is a ventricular arrhythmia secondary to irritation of the myocardium. When present, the offending catheter must be pulled back immediately to restore normal sinus rhythm.

Given the context of this question, this is likely a transient complication of the procedure rather than a patient factor. If all other cardiac investigations are normal and the patient is medically fit, then it would be safe for her to be discharged.

Which one of the following agents is most useful in the maintenance of sinus rhythm in patients with atrial fibrillation?

- ☐ Verapamil
- ☐ Diltiazem
- ☐ Ibutilide
- ☐ Amiodarone
- ☐ Digoxin

Verapamil

10%

Diltiazem

7%

Ibutilide

4%

Amiodarone

68%

Digoxin

11%

A 57-year-old man presents to the Emergency Department with palpitations for the past 36 hours. He has no past history of note. There is no associated chest pain or shortness of breath. Clinical examination is unremarkable other than an irregular tachycardia. An ECG shows atrial fibrillation at a rate of 126 bpm with no other changes. What is the most appropriate management?

- ☐ Beta-blocker + warfarin
- ☐ Digoxin + aspirin
- ☐ Heparinise + cardioversion in the Emergency Department
- ☐ Beta-blocker + aspirin
- ☐ Warfarinise + transthoracic echo with elective electrical cardioversion in 4 weeks

Beta-blocker + warfarin	16%
Digoxin + aspirin	3%
Heparinise + cardioversion in the Emergency Department	53%
Beta-blocker + aspirin	11%
Warfarinise + transthoracic echo with elective electrical cardioversion in 4 weeks	17%

This patient is a good example of someone who would benefit from electrical cardioversion.

A 40-year-old female presents to see her GP with progressive exertional shortness of breath. She previously was able to walk each day to work but more recently has found even short distances challenging. When questioned she also reports occasional palpitations and has noted her socks becoming tight at the end of the day. She has no other medical history, smokes socially and drinks 12 units a week of alcohol.

What is the most likely diagnosis?

- ☐ Chronic obstructive pulmonary disease
- ☐ Idiopathic pulmonary fibrosis
- ☐ Chronic kidney disease
- ☐ Idiopathic pulmonary arterial hypertension
- ☐ Chronic pulmonary embolism

Chronic kidney disease

6%

Idiopathic pulmonary arterial hypertension

73%

Chronic pulmonary embolism

7%

Pulmonary arterial hypertension most commonly presents with exertional dyspnoea. Patients may also experience exertional chest pain, syncope and peripheral oedema

Important for me Less important

The most likely diagnosis in this young patient with no prior medical problems and only a light smoking history is pulmonary arterial hypertension. Patients with pulmonary arterial hypertension typically present with progressive exertional dyspnoea as in this case. They may also experience chest pain, syncope, palpitations and peripheral oedema. Examination findings can include peripheral cyanosis and oedema, a parasternal heave, loud pulmonary component of the second heart sound, raised JVP with a prominent A wave and small volume pulse.

Chronic obstructive pulmonary disease is an incorrect answer and would be unlikely in a patient of this age who is only a social smoker.

Idiopathic pulmonary fibrosis can present with progressive shortness of breath as the lungs become scarred, however, this condition is rare in patients under 50, making pulmonary arterial hypertension which presents in patients aged 30-50 more likely. Patients with pulmonary fibrosis also normally report cough, fatigue and weight loss.

Which of the following congenital heart defects is associated with a bicuspid aortic valve

- ☐ Tetralogy of Fallot
- ☐ Ventricular septal defect
- ☐ Atrial septal defect
- ☐ Coarctation of the aorta
- ☐ Transposition of the great arteries

Which of the following congenital heart defects is associated with a bicuspid aortic valve

Tetralogy of Fallot

12%

Ventricular septal defect

9%

Atrial septal defect

7%

Coarctation of the aorta

65%

Transposition of the great arteries

7%

Which one of the following statements regarding B-type natriuretic peptide is **incorrect**?

- ☐ Effective treatment for heart failure lowers a patients BNP level
- ☐ Acts as a diuretic
- ☐ A hormone produced mainly by the left ventricular myocardium in response to strain
- ☐ Is a good marker of prognosis in patients with chronic heart failure
- ☐ The positive predictive value of BNP is greater than the negative predictive value

Effective treatment for heart failure lowers a patient's BNP level

8%

Acts as a diuretic

9%

A hormone produced mainly by the left ventricular myocardium in response to strain

12%

Is a good marker of prognosis in patients with chronic heart failure

16%

The positive predictive value of BNP is greater than the negative predictive value

54%

BNP has a good negative predictive value rather than positive predictive value

Dr Assem

A 46-year-old female is brought to the hospital after experiencing a headache and blurry vision which began two hours ago. She appears drowsy but is orientated to time, place and person. She has never had a similar episode before and does not remember the last time she has seen a doctor. She denies any chest pain or shortness of breath. She has a respiratory rate of 16 breaths per minute, heart rate of 91 beats per minute and blood pressure of 185/118 mmHg. A random blood glucose was 6.1 mmol/l. The attending doctor decides to begin treatment with hydralazine as it was the only drug available to him at that time. Which of the following best describes the way this medication works in this patient?

- It elevates the levels of cyclic GMP leading to a relaxation of the smooth muscle to a greater extent in the veins than the arterioles
- It elevates the levels of cyclic AMP leading to a relaxation of the smooth muscle to a greater extent in the arterioles than the veins
- It blocks the opening of the voltage-dependent calcium channels in the smooth muscle leading to a decrease in the peripheral vascular resistance
- It elevates the levels of cyclic GMP leading to a relaxation of the smooth muscle to a greater extent in the arterioles than the veins
- It elevates the levels of cyclic GMP by causing a release of nitric oxide which then produce a relaxation of the smooth muscle

It blocks the opening of the voltage-dependent calcium channels in the smooth muscle leading to a decrease in the peripheral vascular resistance 14%

It elevates the levels of cyclic GMP leading to a relaxation of the smooth muscle to a greater extent in the arterioles than the veins 35%

It elevates the levels of cyclic GMP by causing a release of nitric oxide which then produce a relaxation of the smooth muscle 19%

This patient has presented with the signs and symptoms of a hypertensive emergency. She had severe hypertension which is defined as a systolic blood pressure of more than 180mmHg and/or diastolic blood pressure of more than 120 mmHg. She also has evidence of end-organ damage characterized by being drowsy (possible encephalopathy) and blurry vision (papilloedema, retinal hemorrhages). Hydralazine is a blood pressure lowering agent commonly used in the acute setting.

1: This correctly describes the mechanism of action of hydralazine. However, the vasodilating effect of hydralazine tends to be more pronounced in the arterioles than the veins.

2: Hydralazine increases the levels of cyclic GMP and not cyclic AMP.

3: This describes the mechanism of action of calcium channel blockers such as amlodipine.

4: This describes the mechanism of action of hydralazine. Increased levels of cyclic GMP cause the activation of protein kinase G which in turns phosphorylates and activates myosin light chain phosphatase. This dephosphorylates myosin light chains and prevents their binding to actin and therefore prevents the smooth muscle from contracting. This in the veins

A 23-year-old man with a family history of sudden cardiac death is diagnosed as having hypertrophic obstructive cardiomyopathy. Which one of the following is the strongest marker of poor prognosis?

- ☐ Mitral regurgitation
- ☐ Apical hypertrophy
- ☐ Systolic anterior motion of the anterior mitral valve leaflet
- ☐ Septal wall thickness of $> 3\text{cm}$
- ☐ Asymmetric hypertrophy

A 23-year-old man with a family history of sudden cardiac death is diagnosed as having hypertrophic obstructive cardiomyopathy. Which one of the following is the strongest marker of poor prognosis?

Mitral regurgitation

7%

Apical hypertrophy

5%

Systolic anterior motion of the anterior mitral valve leaflet

15%

Septal wall thickness of $> 3\text{cm}$

61%

Asymmetric hypertrophy

12%

HOCM - poor prognostic factor on echo = septal wall thickness of $> 3\text{cm}$

Important for me Less important

A 69-year-old man who takes warfarin for atrial fibrillation asks for advice. He is due to have a tooth extraction at the dentist and is unsure what to do with regards to his 'blood-thinning' tablets. There is no other past medical history of note. The last INR was taken two weeks ago and reported as 2.8 with his target INR being 2.0-3.0. What is the most appropriate advice?

- ☐ Admit to hospital + switch to subcutaneous low-molecular weight heparin prior to extraction
- ☐ Switch to aspirin prior to extraction
- ☐ Check INR 72 hours before procedure, proceed if INR < 4.0
- ☐ Check INR 72 hours before procedure, proceed if INR < 2.5
- ☐ Admit to hospital + switch to intravenous heparin prior to extraction

Admit to hospital + switch to subcutaneous low-molecular weight heparin prior to extraction

13%

Switch to aspirin prior to extraction

5%

Check INR 72 hours before procedure, proceed if INR < 4.0

38%

Check INR 72 hours before procedure, proceed if INR < 2.5

40%

Admit to hospital + switch to intravenous heparin prior to extraction

5%

Dentistry in warfarinised patients - check INR 72 hours before procedure, proceed if INR < 4.0

Important for me Less important

The BNF gives specific advice with regards to this, in the section 'Prescribing in dental practice'. If a patient has a history of an unstable INR then it should be checked within 24 hours of the dental procedure.

You are called to the obstetric ward to see a woman who is fitting. She is 34-weeks pregnant and currently an inpatient for the treatment of severe pre-eclampsia. The anaesthetist has secured the airway and is giving 100% oxygen. What is the most appropriate next step?

- ☐ IV calcium gluconate
- ☐ IV labetalol
- ☐ IV methyldopa
- ☐ IV lorazepam
- ☐ IV magnesium sulphate

You are called to the obstetric ward to see a woman who is fitting. She is 34-weeks pregnant and currently an inpatient for the treatment of severe pre-eclampsia. The anaesthetist has secured the airway and is giving 100% oxygen. What is the most appropriate next step?

IV calcium gluconate

2%

IV labetalol

8%

IV methyldopa

4%

IV lorazepam

5%

IV magnesium sulphate

81%

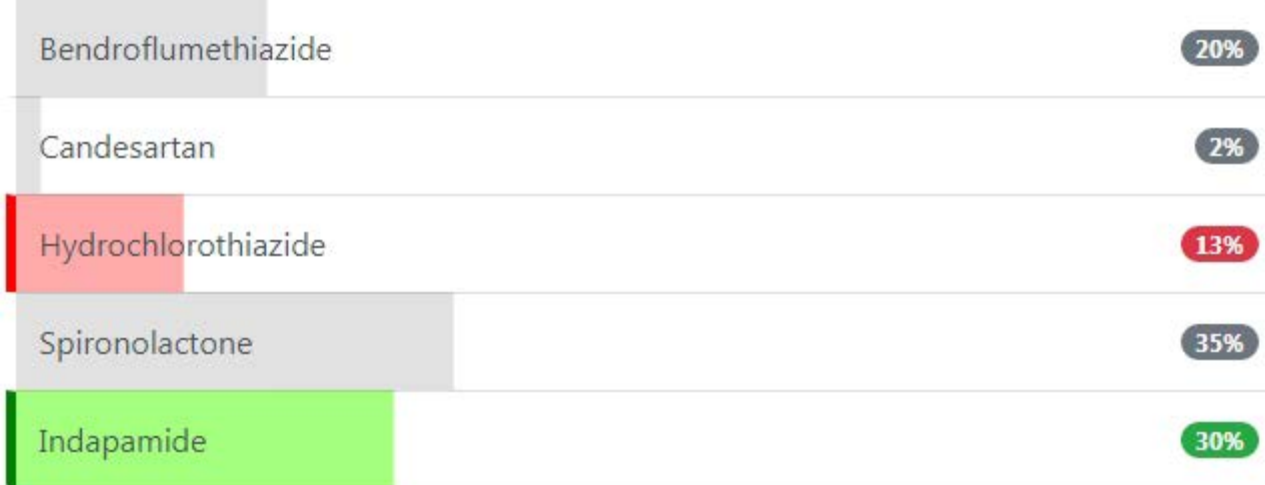
Eclampsia - give magnesium sulphate first-line

Important for me Less important

You are reviewing a 75-year-old male patient with hypertension. He takes 10mg once a day of ramipril and 10mg once a day of amlodipine. His blood pressure remains uncontrolled and you want to start a third agent. His K^+ is 4.3 mmol/l.

According to the NICE guidelines, what would be the most appropriate third-line agent for this man?

- ☐ Bendroflumethiazide
- ☐ Candesartan
- ☐ Hydrochlorothiazide
- ☐ Spironolactone
- ☐ Indapamide



In a hypertensive patient on an ACE-i and calcium channel blocker who requires a third agent, thiazide-type diuretics are next line

Important for me Less important

This patient is >55 years old and is already on an ACE-inhibitor (ramipril) at the maximum dose and a calcium channel blocker (amlodipine) at the maximum dose.

According to the NICE guidelines, thiazide-like diuretics are the next line therapy eg chlortalidone (12.5–25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily). Therefore, the correct answer here is 5, indapamide.

NICE state that a thiazide-like diuretic should be used in preference to a conventional thiazide diuretic such as bendroflumethiazide or hydrochlorothiazide. Therefore, these two answers are wrong. Candesartan is an angiotensin receptor blocker (ARB) and should not be used in conjunction with an ACE-inhibitor. Spironolactone is used as a fourth

A 40-year-old woman who is being treated for refractory hypertension undergoes a coronary angiogram after developing non-specific chest pains. The cardiologist takes a number of measurements during the procedure:

	Pressure (mmHg)
Right femoral artery	122/68
Left ventricle	202/104
Aorta	194/84

The blood pressure in her left arm taking during the procedure was 188/74 mmHg. What is the most likely underlying diagnosis?

- ☐ Left subclavian artery stenosis
- ☐ Renal artery stenosis
- ☐ Coarctation of the aorta
- ☐ Aortic stenosis
- ☐ Results consistent with essential hypertension

Left subclavian artery stenosis

9%

Renal artery stenosis

6%

Coarctation of the aorta

70%

Aortic stenosis

9%

Results consistent with essential hypertension

6%

The most common type of coarctation of the aorta seen in adults is the postductal variety, i.e. the aortic narrowing is distal to the ductus arteriosus. This means that the upper limb blood pressure is greater than that in the lower limbs as the narrowing occurs after the left subclavian artery branches from the aorta.

Another approach to answering this question is to look at the history. A young person with refractory hypertension raises the possibility of secondary, rather than essential (primary) hypertension. The only two diagnoses listed above which cause hypertension are coarctation and renal artery stenosis. This narrows the diagnostic possibilities and makes the question easier to answer.

A 35-year-old man who is an intravenous drug user is admitted to hospital. He has had three previous admissions with infective endocarditis but presents on this occasion feeling generally unwell, complaining of upper abdominal discomfort and leg swelling. On examination he has an elevated jugular venous pressure, tender hepatomegaly and peripheral oedema. A diagnosis of tricuspid regurgitation is suspected. Which one of the following additional features would be most supportive of this diagnosis?

- ☐ Split first heart sound
- ☐ Early diastolic murmur
- ☐ Left parasternal heave
- ☐ Wide pulse pressure
- ☐ Cannon 'a' waves

Split first heart sound

15%

Early diastolic murmur

16%

Left parasternal heave

44%

Wide pulse pressure

9%

Cannon 'a' waves

17%

Left parasternal heave is a feature of tricuspid regurgitation

Important for me

Less important

Which part of the jugular venous waveform is associated with the closure of the tricuspid valve?

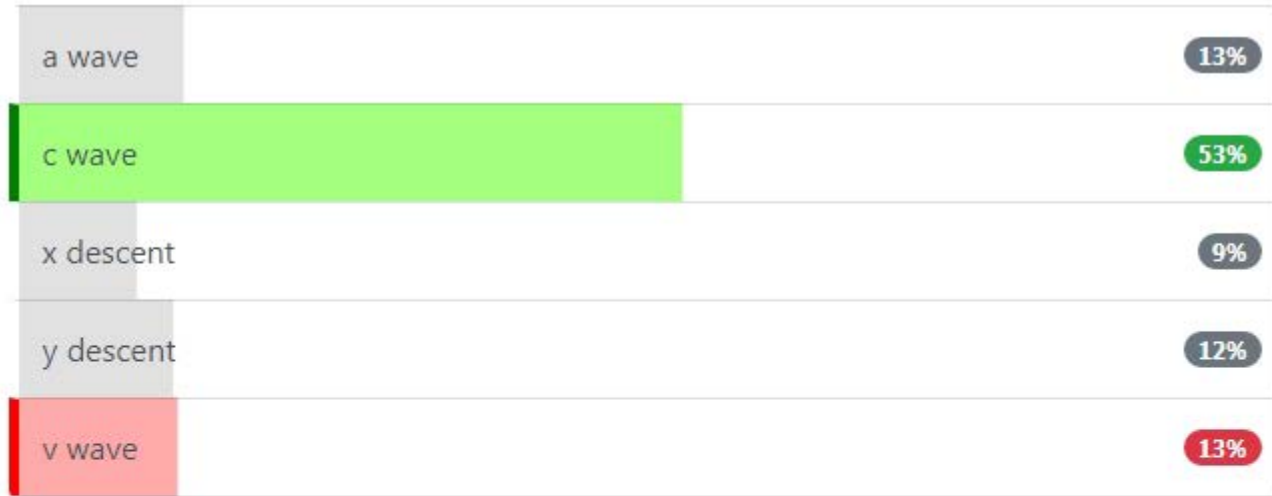
☐ a wave

☐ c wave

☐ x descent

☐ y descent

☐ v wave



JVP: **C** wave - closure of the tricuspid valve

Important for me Less important

The c wave of the jugular venous waveform is associated with the closure of the tricuspid valve

A patient develops a broad complex tachycardia two days following a myocardial infarction. Intravenous amiodarone is given.

Which one of the following best describes the primary mechanism of action of amiodarone?

- ☐ Blocks voltage-gated potassium channels
- ☐ Shortens QT interval
- ☐ Blocks voltage-gated sodium channels
- ☐ Opens sodium channels
- ☐ Blocks voltage-gated calcium channels

Blocks voltage-gated potassium channels

60%

Shortens QT interval

3%

Blocks voltage-gated sodium channels

21%

Opens sodium channels

3%

Blocks voltage-gated calcium channels

13%

Amiodarone - MOA: blocks potassium channels

Important for me Less important

A 70-year-old man is admitted to the Acute Medicine Unit as he is pyrexial and feeling generally unwell. He has a history of ischaemic heart disease and had a myocardial infarction 5 years ago. An echocardiogram is arranged which shows a small vegetation around the mitral valve. Blood cultures are taken which are reported as follows:

Streptococcus viridans

What is the most appropriate antibiotic therapy?

- ☐ IV benzylpenicillin
- ☐ IV benzylpenicillin + ceftriaxone
- ☐ IV flucloxacillin + gentamicin
- ☐ IV vancomycin + rifampicin + gentamicin
- ☐ IV vancomycin + benzylpenicillin

IV benzylpenicillin

56%

IV benzylpenicillin + ceftriaxone

6%

IV flucloxacillin + gentamicin

17%

IV vancomycin + rifampicin + gentamicin

12%

IV vancomycin + benzylpenicillin

9%

A 61-year-old man with a history of hypertension presents with central chest pain. Acute coronary syndrome is diagnosed and conventional management is given. A few days later a diagnostic coronary angiogram is performed. The following week a deteriorating of renal function is noted associated with a purpuric rash on his feet. What is the most likely diagnosis?

- ☐ Aspirin-induced interstitial nephritis
- ☐ Heparin-induced thrombocytopenia
- ☐ Renal artery stenosis
- ☐ Cholesterol embolisation
- ☐ Antiphospholipid syndrome

Aspirin-induced interstitial nephritis

9%

Heparin-induced thrombocytopaenia

18%

Renal artery stenosis

6%

Cholesterol embolisation

64%

Antiphospholipid syndrome

3%

Cholesterol embolisation is a well-documented complication of coronary angiography

A patient with severe aortic stenosis is noted to have a fourth heart sound. Which part of the ECG does this best correlate with?

- ☐ U wave
- ☐ QRS complex
- ☐ P wave
- ☐ ST segment
- ☐ T wave

U wave

16%

QRS complex

15%

P wave

38%

ST segment

11%

T wave

19%

Which one of the following statements regarding prosthetic heart valves is correct?

- ☐ Antibiotic prophylaxis is still recommended for patients with mechanical valves who have dental procedures
- ☐ The majority of mechanical valves are of the ball-and-cage type
- ☐ Bioprosthetic valves are now usually obtained from human cadavers
- ☐ The target INR for patients with mechanical aortic valves is 3.0-4.0
- ☐ Mechanical valves have a lower failure rate than bioprosthetic valves

Antibiotic prophylaxis is still recommended for patients with mechanical valves who have dental procedures

8%

The majority of mechanical valves are of the ball-and-cage type

8%

Bioprosthetic valves are now usually obtained from human cadavers

5%

The target INR for patients with mechanical aortic valves is 3.0-4.0

18%

Mechanical valves have a lower failure rate than bioprosthetic valves

60%

A 23-year-old woman presents to the emergency department with palpitations. She is 26 weeks pregnant. Investigations are undertaken and she is treated for Supraventricular Tachycardia (SVT). She explains this is her 3rd presentation of this.

Which anti-arrhythmic should be used as prophylaxis for SVT?

- ☐ Metoprolol
- ☐ Amiodarone
- ☐ Adenosine
- ☐ Flecainide
- ☐ Verapamil



Although all of the above could be considered as prophylaxis, many are unsuitable in pregnancy.

Amiodarone is contra-indicated due to the risk of teratogenicity and neonatal goitres. Adenosine and Verapamil can cause decreased uterine blood flow, particularly in higher doses, thus are often avoided. Flecainide can be used, but is initiated in specialist care due to the association with foetal toxicity and hyperbilirubinaemia. Metoprolol, although can cause intra-uterine growth restriction, is seen as the safest as toxicity is usually associated with higher doses in treatment of gestational hypertension.

Heart Disease and Pregnancy - (Management of Paroxysmal SVT) :

<http://www.heartdiseaseandpregnancy.com/pdf/phyarr.pdf>

Heart BMJ, Managing palpitations and arrhythmia during pregnancy - (Supra-ventricular Tachycardia section):

<http://heartrhythmuk.org.uk/files/file/Docs/Guidelines/Palpitations%20and%20Pregnancy>

A 25-year-old woman is brought to the Emergency Department by a friend. She developed palpitations around 30 minutes ago whilst drinking a cup of coffee. Her only past medical history of note is asthma and menorrhagia for which she uses a salbutamol inhaler and takes tranexamic acid respectively. The admission ECG shows a supraventricular tachycardia at a rate of 160 bpm. Vagal manoeuvres are unsuccessful. What is the most appropriate next step in her management?

- ☐ Intravenous verapamil
- ☐ Intravenous amiodarone
- ☐ Intravenous adenosine
- ☐ Electrical cardioversion
- ☐ Intravenous esmolol

A 25-year-old woman is brought to the Emergency Department by a friend. She developed palpitations around 30 minutes ago whilst drinking a cup of coffee. Her only past medical history of note is asthma and menorrhagia for which she uses a salbutamol inhaler and takes tranexamic acid respectively. The admission ECG shows a supraventricular tachycardia at a rate of 160 bpm. Vagal manoeuvres are unsuccessful. What is the most appropriate next step in her management?

Intravenous verapamil	43%
Intravenous amiodarone	7%
Intravenous adenosine	43%
Electrical cardioversion	5%
Intravenous esmolol	2%

The administration of adenosine is contraindicated by her history of asthma. Verapamil should therefore be given.

Dilated cardiomyopathy may be caused by deficiency of which one of the following:

- ☐ Chromium
- ☐ Magnesium
- ☐ Pyridoxine
- ☐ Molybdenum
- ☐ Selenium

Dilated cardiomyopathy may be caused by deficiency of which one of the following:



A 57-year-old female presents to the Emergency Department with shortness of breath and pleuritic chest pain. She has no past medical history of note and enjoys good health. Investigations reveal a non-massive pulmonary embolism. What is the recommended length of warfarinisation for this patient?

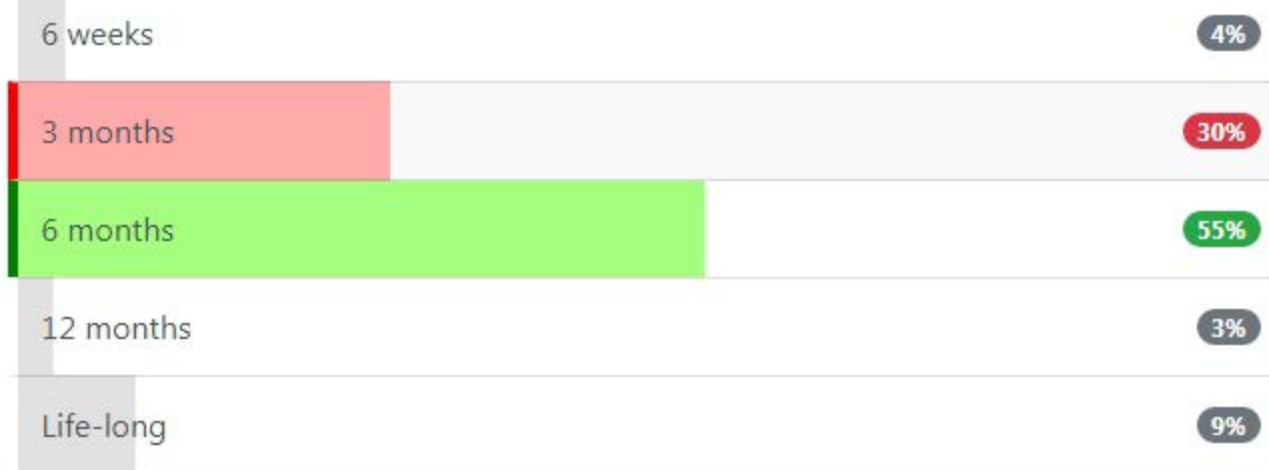
☐ 6 weeks

☐ 3 months

☐ 6 months

☐ 12 months

☐ Life-long



'Unprovoked' pulmonary embolisms are typically treated for 6 months

Important for me Less important

There are no transient risk factors for venous thromboembolism therefore the patient should be anticoagulated for 6 months.

Recent NICE guidelines advise to 'offer a VKA* beyond 3 months to patients with an unprovoked PE'.

*vitamin K antagonists, i.e. warfarin

A 25-year-old female patient with known Bartter's disease presents to the Emergency Department with severe muscle weakness. While awaiting a potassium result from the laboratory, which of the following ECG findings would be the most consistent with severe hypokalaemia?

- ☐ U waves, T-wave inversion, PR shortening
- ☐ U waves, ST depression, T-wave inversion
- ☐ U waves, PR shortening, ST depression
- ☐ T-wave inversion, PR shortening, ST depression
- ☐ T-wave inversion, PR lengthening, ST elevation

U waves, T-wave inversion, PR shortening

22%

U waves, ST depression, T-wave inversion

45%

U waves, PR shortening, ST depression

17%

T-wave inversion, PR shortening, ST depression

8%

T-wave inversion, PR lengthening, ST elevation

8%

ECG changes in electrolyte abnormalities feature frequently in MRCP examinations.

In hypokalaemia, the quoted figure is that ECG abnormalities begin to appear when K^+ falls to below 2.7mmol/L.

A 24-year-old male is diagnosed as having hypertrophic obstructive cardiomyopathy. Which one of the following markers is most useful in assessing risk of sudden death?

- ☐ Abnormal blood pressure changes on exercise
- ☐ Left ventricular outflow tract gradient
- ☐ QT interval
- ☐ Right atrial diameter
- ☐ QRS duration

A 24-year-old male is diagnosed as having hypertrophic obstructive cardiomyopathy. Which one of the following markers is most useful in assessing risk of sudden death?

Abnormal blood pressure changes on exercise

57%

Left ventricular outflow tract gradient

28%

QT interval

8%

Right atrial diameter

3%

QRS duration

4%

You are reviewing a 56-year-old man who has recently been successfully cardioverted following an episode of ventricular tachycardia. He had recently been treated with a course of erythromycin. You are interested to see if he has an underlying prolonged QT interval. What is the most appropriate way to measure the QT interval on the ECG?

- ☐ Time between the end of the Q wave and the start of the T wave
- ☐ Time between the start of the Q wave and the end of the T wave
- ☐ Time between the end of the QRS waveform and the start of the T wave
- ☐ Time between the end of the Q wave and the end of the T wave
- ☐ Time between the start of the Q wave and the start of the T wave

Time between the end of the Q wave and the start of the T wave

8%

Time between the start of the Q wave and the end of the T wave

66%

Time between the end of the QRS waveform and the start of the T wave

6%

Time between the end of the Q wave and the end of the T wave

5%

Time between the start of the Q wave and the start of the T wave

15%

QT interval: Time between the start of the Q wave and the end of the T wave

Important for me Less important

Which one of the following is least recognised as an adverse effect of taking bendroflumethiazide?

☐ Photosensitivity rash

☐ Agranulocytosis

☐ Hypokalaemia

☐ Pancreatitis

☐ Hirsutism

Which one of the following is least recognised as an adverse effect of taking bendroflumethiazide?

Photosensitivity rash

9%

Agranulocytosis

20%

Hypokalaemia

9%

Pancreatitis

11%

Hirsutism

52%

A 74-year-old gentleman has been referred in by his GP with a one day history of shortness of breath. He has had a dry cough for one week, but denies any sputum production or fevers. His past medical history includes hypertension and a transurethral resection of the prostate 3 weeks ago. He takes ramipril and tamsulosin. He previously smoked 10 cigarettes per day for 20 years.

On examination his chest is clear but his respiratory rate is 24/min and his oxygen saturations are 91% on air. His heart rate is 105/min and blood pressure is 145/84mmHg. His ECG shows a sinus tachycardia. A chest x-ray is reported as normal. Blood results show:

Hb	129 g/l	Na ⁺	137 mmol/l
Platelets	250 * 10 ⁹ /l	K ⁺	4.3 mmol/l
WBC	9.4 * 10 ⁹ /l	Urea	6.5 mmol/l
Neuts	6.8 * 10 ⁹ /l	Creatinine	84 µmol/l
CRP	29 mg/l		

Venous blood gases:

pH	7.41
pCO2	5.8kPa
pO2	6.1kPa
Bicarbonate	23 mmol/l
Base excess	-1.4 mEq/l
Lactate	1.8 mmol/l

What is the next most appropriate investigation?

☐ Blood cultures

☐ D Dimer

☐ Pulmonary function tests

☐ CT-Pulmonary Angiogram

☒ Arterial Blood Gas

Submit answer

Blood cultures	4%
D Dimer	19%
Pulmonary function tests	4%
CT-Pulmonary Angiogram	64%
Arterial Blood Gas	9%

Here the correct answer is CT-Pulmonary Angiogram, as it is likely this gentleman has a pulmonary embolus (PE).

Given likelihood of PE, tachycardia and recent surgery he would have a high Wells score of 6.

Due to the high Wells score it would be inappropriate to perform a D Dimer, as a negative result would not be enough to exclude PE.

Whilst an arterial blood gas would provide useful information about this gentleman's level of hypoxia, you can already tell he is hypoxic via pulse oximetry. It may add to the weight of evidence suggesting this man has a PE, but you already have enough to warrant a CT-PA.

There is no significant evidence here to suggest that this man is septic or has pneumonia so blood cultures are unnecessary.

A 26-year-old male with a fall from height has arrived to the emergency department via the air ambulance. Following assessment and a trauma CT scan he has bilateral pneumothoraces and an intracranial haemorrhage. Post CT scan he arrests and defibrillation pads are placed on the patient and the rhythm shows pulseless electrical activity (PEA). Chest compressions are commenced immediately and IV access is already gained.

What will you do next?

- ☐ Continue chest compressions until a 2 minute cycle is complete then give adrenaline
- ☐ Give 1mg adrenaline immediately
- ☐ Give a shock at 200J
- ☐ Needle decompression
- ☐ Give three successive shocks

Submit answer

What will you do next?

Continue chest compressions until a 2 minute cycle is complete then give adrenaline	29%
Give 1mg adrenaline immediately	37%
Give a shock at 200J	9%
Needle decompression	21%
Give three successive shocks	5%

ALS - give adrenaline in non-shockable rhythm as soon as possible

Important for me Less important

This gentleman is in PEA chest compressions have already begun and following the ALS algorithm 1mg adrenaline must be given immediately. Thus option 2 is correct.

Option 1 is incorrect, adrenaline must be giving immediately and then chest compressions continue for 2 minutes until further adrenaline is given.

Option 3 is incorrect. PEA is a non-shockable rhythm.

Option 4 is also incorrect but will be part of your management of this patient following option 2, going through the reversible causes (4H's 4T's) of which needle decompression would be involved.

Option 5 is incorrect. The use of up to three quick successive (stacked) shocks is now recommended for ventricular fibrillation/pulseless ventricular tachycardia (VF/VT) occurring in the cardiac catheterisation laboratory or in the immediate post-operative period following cardiac surgery.

Discuss (1)

Improve

Adult advanced life support

The following is based on the 2015 Resus Council guidelines. Please see the link for more details, below is only a very brief summary of key points.

Major points include:

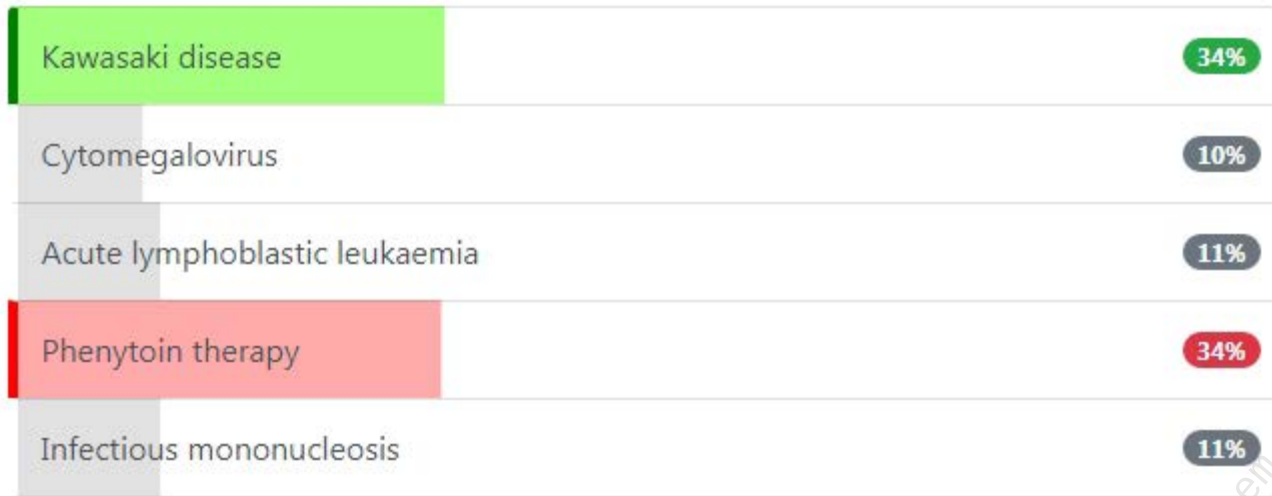
- ratio of chest compressions to ventilation is 30:2
- chest compressions are now continued while a defibrillator is charged
- during a VF/VT cardiac arrest, adrenaline 1 mg is given once chest compressions have restarted after the third shock and then every 3-5 minutes (during alternate cycles of CPR).
- a single shock for VF/pulseless VT followed by 2 minutes of CPR, rather than a series of 3 shocks followed by 1 minute of CPR
- if the cardiac arrested is witnessed in a monitored patient (e.g. in a coronary care unit) then the 2015 guidelines recommend 'up to three quick successive (stacked) shocks', rather than 1 shock followed by CPR
- asystole/pulseless-electrical activity: adrenaline should be given as soon as possible. Should be treated with 2 minutes of CPR prior to reassessment of the rhythm
- atropine is no longer recommended for routine use in asystole or pulseless electrical activity (PEA)
- delivery of drugs via a tracheal tube is no longer recommended
- following successful resuscitation oxygen should be titrated to achieve saturations of 94-98%. This is to address the potential harm caused by hyperoxaemia

Reversible causes of cardiac arrest:

The 'Hs'	The 'Ts'
• Hypoxia • Hypovolaemia • Hyperkalaemia, hypokalaemia, hypoglycaemia, hypocalcaemia, acidaemia and other metabolic disorders • Hypothermia	• Thrombosis (coronary or pulmonary) • Tension pneumothorax • Tamponade – cardiac • Toxins

A 7-year-old male presents with generalised lymphadenopathy. Which one of the following is least likely to result in this presentation?

- ☐ Kawasaki disease
- ☐ Cytomegalovirus
- ☐ Acute lymphoblastic leukaemia
- ☐ Phenytoin therapy
- ☐ Infectious mononucleosis



Kawasaki disease causes only cervical lymphadenopathy

A 34-year-old man who is HIV positive is starting treatment for Burkitt's lymphoma. His chemotherapy regime includes cyclophosphamide, vincristine, methotrexate and prednisolone. Around 24 hours after starting chemotherapy he becomes confused and complains of muscle cramps in his legs. Which one of the following is most likely to have occurred?

- ☐ Prednisolone-induced psychosis
- ☐ Hypercalcaemia
- ☐ Methotrexate pneumonitis leading to hypoxia
- ☐ Haemorrhagic cystitis leading to acute renal failure
- ☐ Tumour lysis syndrome

Prednisolone-induced psychosis

5%

Hypercalcaemia

11%

Methotrexate pneumonitis leading to hypoxia

5%

Haemorrhagic cystitis leading to acute renal failure

5%

Tumour lysis syndrome

75%

Burkitt's lymphoma is a common cause of tumour lysis syndrome

Important for me [Less important](#)

Tumour lysis syndrome occurs as a result of cell breakdown following chemotherapy. This releases a large quantity of intracellular components such as potassium, phosphate and uric acid.

A patient is due to start chemotherapy for metastatic colorectal cancer. What is the main advantage of using capecitabine instead of fluorouracil?

- ☐ Current data shows increased survival
- ☐ Less cardiotoxic
- ☐ Oral administration
- ☐ Less nausea
- ☐ Not renally excreted therefore can be used in patients with chronic kidney disease

Current data shows increased survival

11%

Less cardiotoxic

14%

Oral administration

38%

Less nausea

12%

Not renally excreted therefore can be used in patients with chronic kidney disease

25%

Capecitabine is an orally administered prodrug which is enzymatically converted to 5-fluorouracil in the tumour.

A 67-year-old woman is referred to the haematology clinic. Her GP has noted that her platelet count is persistently elevated and no reactive cause can be found. Bloods taken a week before clinic are as follows:

Hb	15.4 g/dl
Platelets	$784 \times 10^9/l$
WBC	$5.3 \times 10^9/l$
JAK2 kinase (V617F mutation)	Positive

What is the treatment of choice?

- ☐ Imatinib
- ☐ Stem-cell transplantation
- ☐ Hydroxycarbamide
- ☐ Vincristine
- ☐ Venesection

Imatinib

14%

Stem-cell transplantation

7%

Hydroxycarbamide

42%

Vincristine

10%

Venesection

26%

A 67-year-old woman is reviewed 6 months after she had a mastectomy following a diagnosis of breast cancer. Which one of the following tumour markers is most useful in monitoring her disease?

☐ CA 125

☐ CD 34

☐ CA 15-3

☐ CA 19-9

☐ CD 117

CA 125

17%

CD 34

5%

CA 15-3

65%

CA 19-9

9%

CD 117

4%

CA 15-3 is a tumour marker in breast cancers

Important for me

Less important

Burkitt's lymphoma is associated with a mutation in which one of the following genes?

- ☐ Cyclin D1 gene
- ☐ PML gene
- ☐ BCR-ABL gene
- ☐ RAR-alpha gene
- ☐ MYC gene

Cyclin D1 gene

6%

PML gene

6%

BCR-ABL gene

14%

RAR-alpha gene

6%

MYC gene

68%

Which one of the following is least associated with eosinophilia?

- ☐ Churg-Strauss syndrome
- ☐ Nematode infection
- ☐ Histoplasmosis
- ☐ Allergic bronchopulmonary aspergillosis
- ☐ Asthma

Churg-Strauss syndrome

13%

Nematode infection

19%

Histoplasmosis

42%

Allergic bronchopulmonary aspergillosis

18%

Asthma

8%

John, a 35-year-old gentleman on the gastrointestinal ward has been suffering from melaena for a week. His haemoglobin level today is 60g/L and the consultant has requested that you transfuse John a unit of packed red blood cells. Within minutes of starting the transfusion, John complains of itching and stinging sensations on his trunk. On examination, you observe red raised welts over his abdomen and chest. His blood pressure is unaltered from prior to the transfusion at 130/70mmHg, his temperature is 37°C and there are no signs of dyspnoea, wheezing, stridor or angioedema. Which one of the following management options is the most appropriate?

- ☐ Temporary transfusion termination and an antihistamine
- ☐ Permanent transfusion termination, generous fluid resuscitation with saline solution and inform the lab
- ☐ Permanent transfusion termination, intramuscular adrenaline, antihistamines, corticosteroids, bronchodilators and supportive care
- ☐ Temporary transfusion termination and an antipyretic
- ☐ Permanent transfusion termination and high dose immune globulin therapy

Temporary transfusion termination and an antihistamine	63%
Permanent transfusion termination, generous fluid resuscitation with saline solution and inform the lab	15%
Permanent transfusion termination, intramuscular adrenaline, antihistamines, corticosteroids, bronchodilators and supportive care	10%
Temporary transfusion termination and an antipyretic	7%
Permanent transfusion termination and high dose immune globulin therapy	6%

For urticarial blood transfusion reactions without anaphylaxis, an antihistamine should be given and the transfusion temporarily stopped

Important for me Less important

This patient is suffering from an urticarial rash following blood transfusion, hence the transfusion should be stopped and an antihistamine given. Once the symptoms resolve, the transfusion may be continued with no need for further workup.

Additional IM adrenaline, corticosteroids, bronchodilators and supportive care would only be required for symptoms of anaphylaxis or severe allergic reaction. This patient does not have angioedema or signs of breathing difficulties.

A 66-year-old woman with lung cancer develops a deep vein thrombosis. She is reviewed in the hospital clinic and started on treatment dose low-molecular weight heparin (LMWH). What is the most appropriate treatment plan?

- ☐ Switch to warfarin, continue for 6 months
- ☐ Switch to warfarin, continue for 3 months
- ☐ Continue on LMWH for 6 months
- ☐ Continue on LMWH for 6 weeks
- ☐ Continue on LMWH for 3 months

Switch to warfarin, continue for 6 months

24%

Switch to warfarin, continue for 3 months

21%

Continue on LMWH for 6 months

37%

Continue on LMWH for 6 weeks

5%

Continue on LMWH for 3 months

14%

Cancer patients with VTE - 6 months of LMWH

Important for me Less important

Patients with active cancer are at continued risk of thrombosis. For this reason a 6 month course of anticoagulation is recommended. Low-molecular weight heparin has the advantage of being more easy to reverse and stop if a cancer-related bleed occurs, for example massive haemoptysis in a patient with lung cancer.

A 69-year-old male patient of yours is found to have an elevated serum paraprotein level of 35g/L. Bone marrow aspirate reveals 32% monoclonal plasma cell infiltrate. He has no evidence of anaemia, renal impairment, hypercalcaemia or lytic lesions. What is the next step in management?

- ☐ Observe and monitor
- ☐ Arrange for autologous stem cell transplantation
- ☐ Commence thalidomide
- ☐ Commence dexamethasone
- ☐ Commence combined therapy with prednisolone and thalidomide / bortezomib

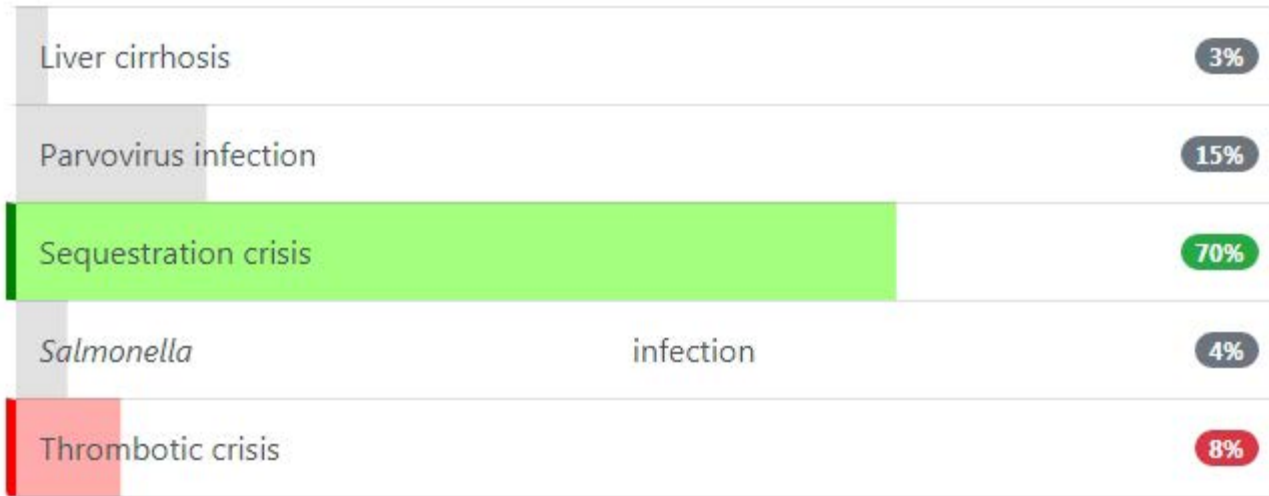
Observe and monitor	57%
Arrange for autologous stem cell transplantation	7%
Commence thalidomide	7%
Commence dexamethasone	9%
Commence combined therapy with prednisolone and thalidomide / bortezomib	20%

This question is asking about the diagnostic criteria for multiple myeloma and its subsequent management. Here, because the patient is asymptomatic but has the criteria for multiple myeloma, the underlying diagnosis of this stem is smoldering multiple myeloma. The treatment of smoldering multiple myeloma is typically to watch and wait.

This decision to delay therapy in patients with smoldering multiple myeloma is supported by a 2003 Cochrane meta-analysis that compared chemotherapy at diagnosis versus deferral of chemotherapy until progression. Early treatment delayed progression of the disease but did not have significant effects on mortality or response rate, and early treatment may have increased the risk of acute leukaemia.

A 4-year-old girl with sickle cell anaemia presents with abdominal pain. On examination, she is noted to have splenomegaly and is clinically anaemic. What is the most likely diagnosis?

- ☐ Liver cirrhosis
- ☐ Parvovirus infection
- ☐ Sequestration crisis
- ☐ *Salmonella* infection
- ☐ Thrombotic crisis



During a sequestration crisis, the sickle cells cause the spleen to become grossly enlarged causing the abdominal pain as present in this case. This is more common in early childhood as repeated sequestration and infarction of the spleen during childhood gradually results in an auto-splenectomy. A sequestration crisis may result in severe anaemia, marked pallor and cardiovascular collapse due to loss of effective circulating volume.

A 7-year-old boy who recently emigrated from Nigeria was seen in emergency department with a 6 week history of progressive swelling of his jaw, fevers, night sweats and weight loss. He had no past medical history but his mother describes a sore throat in the past, which was treated with antibiotics, but unfortunately developed a rash subsequently. On examination there was a painless 4x3cm mass that was fixed and hard. The only other examination findings of note was rubbery symmetrical cervical lymphadenopathy.

What translocation would most likely to found on biopsy karyotyping?

- ☐ T9:22
- ☐ T15:17
- ☐ T8:14
- ☐ T14:18
- ☐ T11:14

T8:14	55%
T14:18	11%
T11:14	10%

Burkitt's lymphoma is an uncommon, very high grade non Hodgkin's lymphoma endemic to west Africa and the mosquito belt. There is a close association with contraction of Epstein Barr virus (EBV). Burkitt's lymphoma often presents with symmetrical painless lymphadenopathy, systemic B symptoms (fever, sweats and weight loss), central nervous system involvement and bone marrow infiltration. Classically in the textbooks the patient also develops a large jaw tumour.

T9:22 - Chronic myeloid leukaemia - 9 ABL (oncogene - an aberrant tyrosine kinase) + 22 B cell receptor

T15:17 - Acute pro-myelocytic leukaemia - 15 Promyelocytic gene + 17 Retinoid acid receptor alpha (Fusion protein binds retinoid acid receptor and promotes transcription).

T8:14 - Burkitt's Lymphoma - 8 c-myc (oncogene) + 14 Ig heavy constant region

T14:18 - Follicular Lymphoma - 14 Ig heavy constant region + 18 Bcl2 (anti-apoptotic gene)

T11:14 - Mantle Cell Lymphoma - 11 - Cyclin D (oncogene) + 14 Ig heavy constant region

A 67-year-old man is diagnosed with myelofibrosis. What is the most common presenting symptom of myelofibrosis?

- ☐ Lethargy
- ☐ Anorexia and weight loss
- ☐ Night sweats
- ☐ Easy bruising
- ☐ Splenomegaly

Lethargy

57%

Anorexia and weight loss

10%

Night sweats

6%

Easy bruising

11%

Splenomegaly

16%

Myelofibrosis - most common presenting symptom - lethargy

Important for me

Less important

Whilst all the above may be seen in myelofibrosis lethargy is the most common

Which of the following is a cause of extravascular haemolysis?

- ☐ Hereditary spherocytosis
- ☐ Paroxysmal nocturnal haemoglobinuria
- ☐ Disseminated intravascular coagulation
- ☐ Mismatched blood transfusion
- ☐ Haemolytic uraemic syndrome

Hereditary spherocytosis

60%

Paroxysmal nocturnal haemoglobinuria

16%

Disseminated intravascular coagulation

7%

Mismatched blood transfusion

7%

Haemolytic uraemic syndrome

11%

Extravascular haemolysis - hereditary spherocytosis

Important for me Less important

A 48-year-old man presents with a swollen, red and painful left calf. After being referred to the deep vein thrombosis (DVT) clinic he is diagnosed with having a proximal DVT and commenced on low-molecular weight heparin whilst awaiting review by the warfarin clinic.

There is no obvious precipitating factor for this such as recent surgery or a long haul flight. He is generally fit and well and takes no regular medication other than propranolol as migraine prophylaxis. There is no history of venous thromboembolism in his family.

Other than commencing warfarin, what further action, if any, is required?

- ☐ No further action is required
- ☐ Investigate for underlying malignancy + check anti-phospholipid antibodies
- ☐ Check anti-phospholipid antibodies + hereditary thrombophilia screen
- ☐ Check anti-Xa levels
- ☐ Perform an echocardiogram

No further action is required

17%

Investigate for underlying malignancy + check anti-phospholipid antibodies

53%

Check anti-phospholipid antibodies + hereditary thrombophilia screen

20%

Check anti-Xa levels

4%

Perform an echocardiogram

6%

NICE would recommend doing a chest x-ray, blood and urine tests initially to exclude an underlying malignancy. If these are normal, a CT abdomen and pelvis should be arranged as the patient is > 40 years. They also recommend checking anti-phospholipid antibodies for the first unprovoked DVT/PE. There is no history to support an inherited thrombophilia.

A 30-year-old male with sickle cell disease presents to the Emergency Department (ED) with fever, tachypnoea and rib pain. On examination, they have a low grade fever of 37.9°C, oxygen saturations of 95% on air, and on auscultation there are bilateral vesicular breath sounds. A chest X-ray shows opacification in the right middle zone. Which of these statements most accurately describes the management of this patient?

- ☐ Bronchodilators are indicated
- ☐ The patient should undergo a simple transfusion to a target Hb > 8g/L
- ☐ The patient should undergo an exchange transfusion to a target Hb > 8g/L
- ☐ Incentive spirometry is indicated
- ☐ Empirical antibiotic therapy is not indicated

Incentive spirometry is indicated

27%

Empirical antibiotic therapy is not indicated

10%

This question requires the candidate first of all to diagnose this presentation as an acute chest syndrome. The British Committee for Standards in Haematology (BCSH) defines this as 'an acute illness characterized by fever and/or respiratory symptoms, accompanied by a new pulmonary infiltrate on chest X-ray'.

The fundamentals of initial management are as follows:

- Oxygen therapy to maintain saturations > 95%
- Intravenous fluids to ensure euvolaemia
- Adequate pain relief
- Incentive spirometry in all patients presenting with rib or chest pain
- Antibiotics with cover for atypical organisms
- Early consultation with the critical care team and haematology

A senior haematologist will make a decision as to whether a simple or exchange transfusion is necessary, and guidelines suggest an Hb target of 100-110g/L in either instance. On presentation, patients with acute chest syndrome should be fully cross matched and a history of red cell antibodies sought.

Bronchodilators are indicated if asthma co-exists with acute chest syndrome, or if there is evidence of acute bronchospasm on auscultation.

A 24-year-old female presents to the acute medical take with several lumps in her neck and under her arms, weight loss, vomiting and low mood. She is found to have several areas of suspicious lymphadenopathy, including in the neck, both axillae and mediastinum. She also has multiple lesions in her liver. All lesions are confirmed to be manifestations of Hodgkin's lymphoma after biopsy and discussion at the oncology MDT. Which stage of disease does she have?

☐ I

☐ II

☐ III

☐ IV

☐ V



Spread into the liver, bone marrow, lungs or other organs would be classified as stage IV on the Ann Arbor staging system for Hodgkin's lymphoma

Important for me Less important

This patient has stage IV disease as per the Ann Arbor scale. She has spread of disease beyond the lymph nodes into the liver.

Stage I consists of disease in one lymph node area only. Stage II consists of disease in two lymph node areas, but both on the same side of the diaphragm. Stage III consists of disease in two lymph node areas on different sides of the diaphragm. Stage IV consists of the spread of disease beyond the lymph nodes, into the liver, lungs or bone marrow. Stage V is not included in the scale.

Lymphoma Association: Staging of lymphoma.

<https://www.lymphomas.org.uk/about-lymphoma/what-is-lymphoma/staging-lymphoma>

A blood film is reported as follows:

Howell-Jolly bodies, target cells and occasional Pappenheimer bodies are seen

What is the most likely underlying cause?

- ☐ Iron-deficiency anaemia
- ☐ Lead poisoning
- ☐ Myelofibrosis
- ☐ Sideroblastic anaemia
- ☐ Post-splenectomy

Iron-deficiency anaemia

7%

Lead poisoning

7%

Myelofibrosis

6%

Sideroblastic anaemia

14%

Post-splenectomy

66%

You are reviewing a man who has metastatic small cell lung cancer. He has developed a progressively severe headache over the past week. As part of your differential diagnosis you consider superior vena cava obstruction. What is the most common feature of this condition?

- ☐ Nasal stuffiness
- ☐ Visual disturbance
- ☐ Arm swelling
- ☐ Facial swelling
- ☐ Dyspnoea

Nasal stuffiness

5%

Visual disturbance

6%

Arm swelling

9%

Facial swelling

47%

Dyspnoea

34%

SVC obstruction - dyspnoea is the most common symptom

Important for me Less important

A 48-year-old man is diagnosed with acute myeloid leukaemia and cytogenetics are performed. Which one of the following is associated most with a poor prognosis?

- ☐ Deletions of chromosome 5
- ☐ Translocation between chromosome 15 and 17
- ☐ Deletions of chromosome 15
- ☐ Translocation between chromosome 9 and 14
- ☐ Deletions of chromosome 8

Deletions of chromosome 5

36%

Translocation between chromosome 15 and 17

27%

Deletions of chromosome 15

9%

Translocation between chromosome 9 and 14

21%

Deletions of chromosome 8

8%

Acute myeloid leukaemia - poor prognosis: deletion of chromosome 5 or 7

Important for me Less important

What are the most common types of transformations seen in patients with polycythaemia vera?

- ☐ Myelodysplasia + chronic myeloid leukaemia
- ☐ Myelofibrosis + chronic myeloid leukaemia
- ☐ Myelodysplasia + myelofibrosis
- ☐ Myelofibrosis + acute myeloid leukaemia
- ☐ Myelodysplasia + acute myeloid leukaemia

What are the most common types of transformations seen in patients with polycythaemia vera?

Myelodysplasia + chronic myeloid leukaemia	15%
Myelofibrosis + chronic myeloid leukaemia	20%
Myelodysplasia + myelofibrosis	17%
Myelofibrosis + acute myeloid leukaemia	31%
Myelodysplasia + acute myeloid leukaemia	17%

Polycythaemia rubra vera - around 5-15% progress to myelofibrosis or AML

Important for me Less important

Each one of the following is seen in Wiskott-Aldrich syndrome, except:

- ☐ Thrombocytopenia
- ☐ Recurrent chest infections
- ☐ X-linked recessive inheritance
- ☐ Mutation in the WASP gene
- ☐ Psoriasis

Thrombocytopenia

11%

Recurrent chest infections

8%

X-linked recessive inheritance

18%

Mutation in the WASP gene

10%

Psoriasis

53%

Dr. ASSOCIATE

Which of the following cytotoxic agents is most associated with ototoxicity?

☐ Vincristine

☐ Bleomycin

☐ Cisplatin

☐ Doxorubicin

☐ Cyclophosphamide

Vincristine

16%

Bleomycin

13%

Cisplatin

57%

Doxorubicin

7%

Cyclophosphamide

8%

Cisplatin may cause ototoxicity

Important for me

Less important

A 26-year-old female is diagnosed with an unprovoked DVT and a thrombophilia screen is performed.

What abnormality is most likely to be found?

- ☐ Factor V Leiden
- ☐ Lupus anticoagulant
- ☐ Protein C deficiency
- ☐ Protein S deficiency
- ☐ Waldenstrom's macroglobulinaemia

Factor V Leiden	55%
Lupus anticoagulant	18%
Protein C deficiency	13%
Protein S deficiency	9%
Waldenstrom's macroglobulinaemia	6%

Factor V Leiden is the commonest inherited thrombophilia

Important for me Less important

Factor V Leiden is the commonest inherited thrombophilia in European populations (approximately 5% prevalence of a heterozygous mutation).

Protein C and S deficiency are possible answers but both are less common than Factor V Leiden. Lupus anticoagulant is another possible answer and features in antiphospholipid syndrome but this is again less common.

Waldenstrom's macroglobulinaemia typically presents in elderly males with symptoms of hyperviscosity.

Dr Assem

Each one of the following is associated with polycythaemia vera, except:

☐ Splenomegaly

☐ Hyperviscosity

☐ Raised ESR

☐ Hypertension

☐ Pruritus

Splenomegaly

13%

Hyperviscosity

3%

Raised ESR

51%

Hypertension

26%

Pruritus

8%

Polycythaemia rubra vera is associated with a low ESR

Important for me Less important

A 61-year-old man is referred by his family physician to a hematologist after he presented with a right-sided painless neck lump. The lump started small and has been slowly increasing in size. More recently a second lump has appeared which prompted the family physician to refer the patient.

The patient has also been complaining of lethargy, night sweats and has lost significant weight. Thyroid function tests are normal and the patient does not have a significant family history. There is no recent travel or contact history. Biopsy of the nodes and cytogenetic analysis show a translocation causing increased B-cell lymphoma 2 (BCL-2) transcription which confirms the diagnosis. Unfortunately, the patient's condition cannot be treated with imatinib.

Which of the following translocation does this patient have?

☐ t(14;18)

☐ t(11;14)

☐ t(15;17)

☐ t(12;15)

☐ t(11;22)

t(14;18)	41%
t(11;14)	22%
t(15;17)	21%
t(12;15)	5%
t(11;22)	11%

The t(14;18) translocation causes increased BCL-2 transcription and causes follicular lymphoma

Important for me Less important

This patient presented with the signs and symptoms suggestive of non-Hodgkin lymphoma. This is supported by the signs and symptoms of weight loss, night sweats, and painless lymphadenopathy. Non-Hodgkin lymphoma is one class of lymphoma, with the other class being Hodgkin lymphoma. There are several types of Hodgkin lymphoma which are actually neoplasms of mature B cells, and very rarely of T cell origin. In this case, a cytogenetic analysis revealed a translocation causing increased BCL-2 transcription. This is associated with the t(14;18) translocation which causes follicular lymphoma. (First Aid 2017, p407-410).

2: t(11;14) is associated with Mantle cell lymphoma, which is a type of non-Hodgkin lymphoma. There is a translocation of cyclin D1 on chromosome 11 and heavy-chain Ig on chromosome 14. Mantle cell lymphoma is characteristic of being CD5 positive. It is known to be an aggressive tumor with late presentation and therefore poor prognosis.

3: t(15;17) is associated with the acute promyelocytic leukemia (APL) subtype of acute myeloid leukemia (AML). AML usually presents in patients above 65 years of age. The therapeutic importance of knowing the APL subtype is that it responds to all-trans retinoic acid (vitamin A).

4: t(12;15) is associated with the development of breast cancer, more specifically secretory breast carcinoma. This type of breast cancer is known to be rare and the clinical outcome following is usually good.

5: t(11;22) is a translocation which occurs in Ewing sarcoma. This is a malignant bone tumor which often occurs in individuals under 15 years of age. The disease is known to be very aggressive and is associated with the development of early metastases.

A 52-year-old woman with a history of hypothyroidism presents with lethargy and a sore tongue. Blood tests are reported as follows:

Hb	10.7 g/dl
MCV	121 fl
Plt	$177 \times 10^9/l$
WBC	$5.4 \times 10^9/l$

Further tests are ordered:

Vitamin B12	64 ng/l (200-900 ng/l)
Folic acid	7.2 nmol/l (> 3.0 nmol/l)

What is the most appropriate management?

- ☐ 1 mg of IM hydroxocobalamin once every 3 months
- ☒ 1 mg of IM hydroxocobalamin 3 times each week for 2 weeks, then once every 3 months
- ☐ 1 mg of IM hydroxocobalamin once every 2 months + folic acid 5mg od
- ☐ Give folic acid 5mg od one week then recheck bloods
- ☐ 1 mg of IM hydroxocobalamin 3 times each week for 2 weeks, then once every 3 months + folic acid 5mg od

Submit answer

1 mg of IM hydroxocobalamin once every 3 months

6%

1 mg of IM hydroxocobalamin 3 times each week for 2 weeks, then once every 3 months

63%

1 mg of IM hydroxocobalamin once every 2 months + folic acid 5mg od

4%

Give folic acid 5mg od one week then recheck bloods

3%

1 mg of IM hydroxocobalamin 3 times each week for 2 weeks, then once every 3 months + folic acid 5mg od

24%

If the patient was deficient in folic acid it would be important to treat the B12 deficiency first to avoid precipitating subacute combined degeneration of the cord.

A patient with testicular cancer is started on cisplatin therapy. Which of the following side-effects is most characteristically associated with cisplatin?

- ☐ Liver cirrhosis
- ☐ Alopecia
- ☐ Peripheral neuropathy
- ☐ Haemorrhagic cystitis
- ☐ Cardiomyopathy

Liver cirrhosis

7%

Alopecia

10%

Peripheral neuropathy

67%

Haemorrhagic cystitis

9%

Cardiomyopathy

7%

Cisplatin may cause peripheral neuropathy

Important for me

Less important

A patient with lung cancer has a Positron Emission Tomography (PET) scan to evaluate possible metastatic disease. What does this type of scan demonstrate?

- ☐ Cellular proliferation
- ☐ Apoptotic activity
- ☐ Glucose uptake
- ☐ Vascular supply
- ☐ Tyrosine kinase activity

Cellular proliferation

11%

Apoptotic activity

8%

Glucose uptake

66%

Vascular supply

8%

Tyrosine kinase activity

7%

A 71-year-old woman with no significant past medical history is investigated for lymphocytosis. She has recently lost 7kg in weight and complains of lethargy. The following blood results are obtained:

Hb	9.8 g/dl
Plt	$104 \times 10^9/l$
WBC	$70.3 \times 10^9/l$
Blood film:	Lymphocytosis. Smudge cells seen

Four months previously her white cell count was $30.5 \times 10^9/l$. What is the most appropriate management?

- ☐ Imatinib
- ☐ Chlorambucil
- ☐ No treatment, monitor full blood count
- ☐ Fludarabine, cyclophosphamide and rituximab
- ☐ Allogeneic stem cell transplantation

Imatinib	21%
Chlorambucil	17%
No treatment, monitor full blood count	15%
Fludarabine, cyclophosphamide and rituximab	39%
Allogeneic stem cell transplantation	10%

CLL - treatment: Fludarabine, Cyclophosphamide and Rituximab (FCR)

Important for me Less important

This patient has chronic lymphocytic leukaemia. The lymphocyte doubling time is less than 6 months, the patient has some evidence of marrow failure and also has systemic symptoms. She should therefore be treated and of the options given a combination of fludarabine, cyclophosphamide and rituximab (FCR) is the most appropriate treatment. Chlorambucil used to be the first-line treatment of choice but studies have shown it not to be as effective as FCR.

As with many haematological cancers such patients are often entered into randomised trials

A 45-year-old man attends ambulatory care with a 2-month history of worsening fatigue. On further questioning he states that whilst he has lost some weight recently, he had attributed this to reduced appetite, stating that he has been feeling full after eating relatively little. On direct questioning he states that on a few occasions over the last 2 weeks he has woken feeling sweaty with damp sheets. On examination the patient has pale conjunctiva and there is a large, firm mass in the left upper quadrant of the abdomen. He is haemodynamically stable, afebrile and there are no signs of respiratory distress.

Initial bloods show:

Hb 105 g/l

Platelets $150 \times 10^9/l$

WBC $50 \times 10^9/l$

The F1 clerking the patient requested an abdominal CT which has been reported by the radiologist as showing massive splenomegaly.

A blood film has been sent and the patient has been discussed with the on-call haematologist who has arranged a bone marrow biopsy and cytogenetics. However, the results of these investigations are not yet available.

Which of the following findings would support a diagnosis of chronic myeloid leukaemia (CML) rather than myelofibrosis?

- ☐ t(15;17) translocation
- ☐ t(8;21) translocation
- ☐ Low leucocyte alkaline phosphatase score
- ☐ Raised leucocyte alkaline phosphatase score
- ☐ Massive splenomegaly

t(15;17) translocation

10%

t(8;21) translocation

7%

Low leucocyte alkaline phosphatase score

50%

Raised leucocyte alkaline phosphatase score

22%

Massive splenomegaly

11%

Leucocyte alkaline phosphatase is low in CML but raised in myelofibrosis

Important for me Less important

The correct answer here is a low leucocyte alkaline phosphatase (LAP) score.

LAP is found within mature white blood cells (WBCs).

Low LAP levels are found in conditions associated with immature/undeveloped WBCs (e.g. CML), whereas pathologies associated with mature WBCs (such as myelofibrosis) cause high LAP levels.

t(15; 18) translocation is associated with acute promyelocytic leukaemia (APML)

t(8;21) translocation is associated with acute myeloid leukaemia (AML)

the Philadelphia chromosome t(9;22) creates a BCL-ABL1 fusion gene that codes for a constitutively active tyrosine kinase receptor. This is associated with 95% of CML cases and is the target for imatinib (a tyrosine kinase inhibitor).

Massive splenomegaly is seen in both CML and myelofibrosis

Dr Assem

A 15-year-old girl presents with abdominal pain. She is normally fit and well and currently takes a combined oral contraceptive pill. The patient is accompanied by her mother, who is known to have hereditary spherocytosis. The pain is located in the upper abdomen and is episodic in nature, but has become severe today. There has been no change to her bowel habit and no nausea or vomiting. What is the most likely diagnosis?

☐ Inferior vena cava thrombosis

☐ Acute pancreatitis

☐ Renal vein thrombosis

☐ Gastritis

☐ Biliary colic

Inferior vena cava thrombosis

15%

Acute pancreatitis

10%

Renal vein thrombosis

13%

Gastritis

4%

Biliary colic

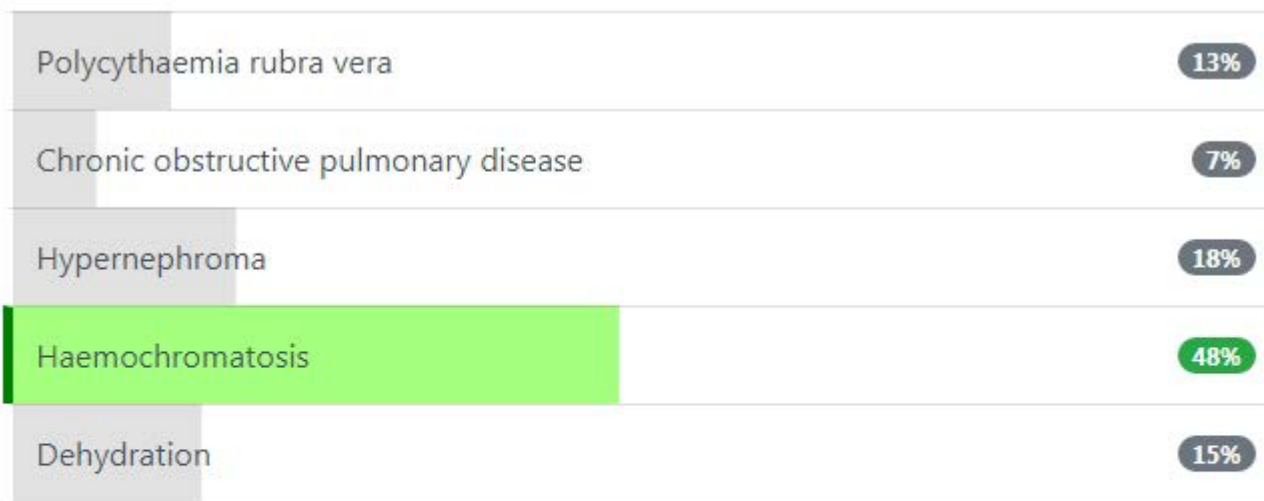
57%

This patient has hereditary spherocytosis resulting in chronic haemolysis and gallstone formation. An important differential in a poorly patient with hereditary spherocytosis would be splenic rupture

Dr. R. Ssem

A 42-year-old female is noted to have a Hb of 17.8 g/dL. Which one of the following is least likely to be the cause?

- ☐ Polycythaemia rubra vera
- ☐ Chronic obstructive pulmonary disease
- ☐ Hypernephroma
- ☐ Haemochromatosis
- ☐ Dehydration



Haemochromatosis is not associated with polycythaemia. Blood tests typically reveal a raised ferritin and iron, associated with a transferrin saturation of greater than 60% and a low total iron binding capacity

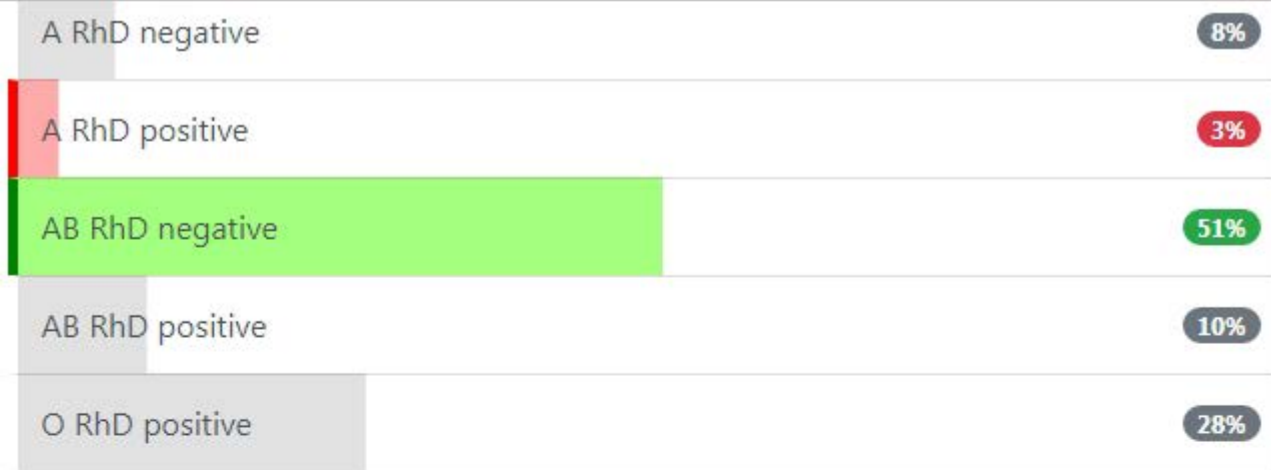
Dr. Assem

A 25-year-old female patient presents with massive haemorrhage. You are working in the hospital blood bank and are asked to prepare 2 units each of Red cells and Fresh Frozen Plasma (FFP) when the result of the group and save is available.

The patient's sample is grouped as B RhD negative. You manage to procure some Group B red cells from the fridge but there is no Group B FFP available.

FFP from a donor of which blood group would be best to give?

- ☐ A RhD negative
- ☐ A RhD positive
- ☐ AB RhD negative
- ☐ AB RhD positive
- ☐ O RhD positive



The universal donor of fresh frozen plasma is AB RhD negative blood

Important for me [Less important](#)

This patient is blood group B RhD negative, meaning her red cells possess B antigens only from the ABO grouping, and she naturally produces anti-A antigens in her plasma. Therefore, she needs to receive red cells with only B antigen or no antigens at all (i.e. Groups B or O) but needs to receive FFP that does not have anti-B in it. Group O donors naturally produce anti-A and anti-B, Group A donors naturally produce only anti-B, so she can only receive FFP from groups B or AB.

Group AB is the universal donor for FFP because they produce neither anti-A or anti-B and is therefore compatible with all ABO groups.

In many cases the RhD status would not matter for blood transfusion, however as this is a woman of childbearing age who is RhD negative, she should receive RhD negative blood in order to avoid problems with future pregnancies in which the foetus is RhD positive.

A 54-year-old female is receiving a course of chemotherapy for breast cancer. She is experiencing troublesome vomiting which has not been helped by domperidone. What is the most appropriate next management step?

- ☐ Add an antihistamine
- ☐ Add a 5HT₂ antagonist
- ☐ Add a phenothiazine
- ☐ Add a dopamine receptor antagonist
- ☐ Add a 5HT₃ antagonist

A 54-year-old female is receiving a course of chemotherapy for breast cancer. She is experiencing troublesome vomiting which has not been helped by domperidone. What is the most appropriate next management step?

Add an antihistamine	4%
Add a 5HT ₂ antagonist	19%
Add a phenothiazine	5%
Add a dopamine receptor antagonist	10%
Add a 5HT ₃ antagonist	62%

A 42-year-old woman presented with sudden onset gait ataxia, intention tremor and nystagmus. CT head demonstrated a 4cm left cerebellar haematoma. She is discussed with the local neurosurgical unit and urgently transferred for intervention. She is repatriated a week later for further rehabilitation. Routine blood tests are notable for a platelet count of $1,700 \times 10^9/l$. Initially, you attribute this to a post-surgical rise. However, on closer examination of her results you realise that on initial presentation her platelet count was $1,300 \times 10^9/l$. What gene mutation is likely to be discovered in this lady?

☐ JAK2

☐ HFE

☐ CFTR

☐ WASP

☐ BCR-ABL

JAK2	72%
HFE	5%
CFTR	6%
WASP	11%
BCR-ABL	6%

This lady has presented with a stroke at a young age, on a background of raised platelets. This is very suggestive of essential thrombocythaemia which is known to be a rare cause of stroke and is associated with a mutation in the JAK2 gene.

HFE mutation is seen in haemochromatosis, CFTR in cystic fibrosis and WASP in Wiskott-Aldrich. Mutations in BCR-ABL are associated with chronic myeloid leukaemia, and is known as the Philadelphia translocation.

A 62-year-old man presents with lethargy. A full blood count is taken and is reported as follows:

Hb	10.2 g/dl
Platelets	$330 \times 10^9/l$
WBC	$15.2 \times 10^9/l$
Film	Leucoerythroblastic picture. Tear-drop poikilocytes seen

What is the most likely diagnosis?

- ☐ Myelodysplasia
- ☐ Chronic lymphocytic leukaemia
- ☐ Myelofibrosis
- ☐ Chronic myeloid leukaemia
- ☐ Post-splenectomy

Myelodysplasia

18%

Chronic lymphocytic leukaemia

8%

Myelofibrosis

57%

Chronic myeloid leukaemia

9%

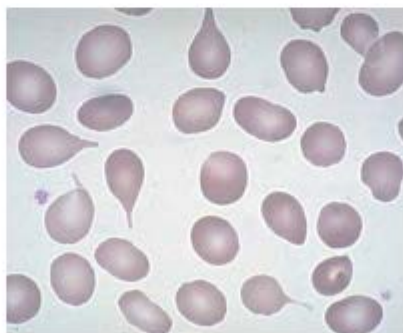
Post-splenectomy

8%

Myelofibrosis is associated with 'tear drop' poikilocytes on blood film

Important for me [Less important](#)

Thrombocytopenia and leucopenia are seen in progressive disease.



Blood film showing tear-drop poikilocytes

You are an SHO on an acute oncology ward. You are asked to speak to a 56-year-old man with colorectal cancer. He was diagnosed 1 month ago after participating in screening. Following a positive faecal occult blood test, colonoscopy demonstrated a malignant lesion in the descending colon. CT staging showed lymph node involvement but no distant metastases. He has undergone a left-hemicolectomy and is due to start adjuvant chemotherapy with a combination of 5-FU and oxaliplatin. During his work-up, his consultant explained that he would need to be monitored for disease recurrence.

Which of the following has a role in monitoring disease activity in colorectal cancer?

- ☐ Alpha-Fetoprotein (AFP)
- ☐ Mesorectal MRI
- ☐ Ca-19-9
- ☐ Carcinoembryonic Antigen (CEA)
- ☐ Ca-15-3

Alpha-Fetoprotein (AFP)	5%
Mesorectal MRI	3%
Ca-19-9	6%
Carcinoembryonic Antigen (CEA)	83%
Ca-15-3	3%

Carcinoembryonic Antigen (CEA) is a tumour marker in colorectal cancer and has a role in monitoring disease activity

Important for me [Less important](#)

The correct answer is carcinoembryonic antigen (CEA). CEA is a known tumour marker for colorectal cancer. It is not used diagnostically, but in patient's with a known diagnosis of colorectal cancer associated with raised CEA levels, it can be used to monitor disease activity and help with early identification of disease recurrence.

A 72-year-old woman is found to have a marked lymphocytosis associated with smudge cells on the blood film. A diagnosis of chronic lymphocytic leukaemia is suspected. Which one of the following is the investigation of choice?

- ☐ Immunophenotyping
- ☐ Bone marrow aspiration
- ☐ Protein electrophoresis
- ☐ White cell scan
- ☐ Bone marrow trephine

Immunophenotyping	51%
Bone marrow aspiration	21%
Protein electrophoresis	6%
White cell scan	5%
Bone marrow trephine	16%

CLL - immunophenotyping is investigation of choice

Important for me Less important

Immunophenotyping will demonstrate the cells to be B-cells (CD19 positive). CD5 and CD23 are also characteristically positive in chronic lymphocytic leukaemia

A 67-year-old gentleman presents with the blurring of his vision. This was sudden in onset and associated with this was shortness of breath and headache which came on gradually following the blurry vision. His past medical history includes treatment of squamous cell carcinoma of the lung which has failed to shrink despite the chemotherapy. On examination, he is short of breath with bulging veins on his forehead. Fundoscopic examination reveals papilloedema. His face appears swollen. Pemberton sign is positive. You administer oxygen and called for help. What is the next immediate step in managing this?

☐ Administer dexamethasone

☐ IM adrenaline

☐ Topical latanoprost

☐ Full blood count

☐ Mannitol

Administer dexamethasone	79%
IM adrenaline	4%
Topical latanoprost	3%
Full blood count	2%
Mannitol	12%

SVC obstruction can cause visual disturbances such as blurred vision

Important for me Less important

This is superior vena cava obstruction. Due to the malignancy present, the superior vena cava has been compressed by a tumour. This is confirmed by the bulging of the veins on the forehead (back pressure due to compression), the papilloedema which is a sign of raised intracranial pressure and Pemberton sign. This is when you ask a patient to raise their arms until they touch the side of their face. If they develop cyanosis or worsening of their shortness of breath or facial congestion, it is said to be positive. The next best step would be a steroid to dampen the inflammatory response to a tumour and swelling. Then either a stent or radiotherapy/ chemotherapy would be given.

IM adrenaline would be useful if this was anaphylaxis. It would not be appropriate here.

Latanoprost is a treatment for glaucoma. It is a prostaglandin analogue and serves to reduce ocular pressure. This would not be the next immediate treatment in this condition.

A full blood count will be taken, but it is not the main priority.

Mannitol would not be suitable here. It is given to reduce intracranial pressure. However, dexamethasone is more effective.

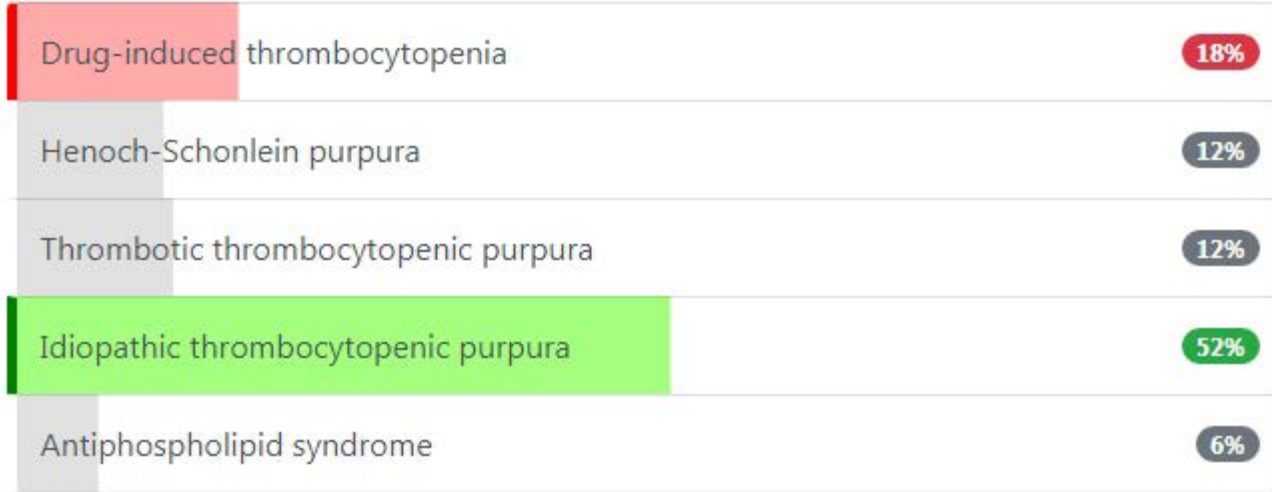
A 34-year-old female presents due to the development of a purpuric rash on the back of her legs. Her only regular medication is Microgynon 30. She also reports frequent nose bleeds and menorrhagia. A full blood count is requested:

Hb	11.7 g/dl
Platelets	$62 \times 10^9/l$
WCC	$5.3 \times 10^9/l$
PT	11 secs
APTT	30 secs
Factor VIIIc activity	Normal

What is the most likely diagnosis?

- ☐ Drug-induced thrombocytopenia
- ☐ Henoch-Schonlein purpura
- ☐ Thrombotic thrombocytopenic purpura
- ☐ Idiopathic thrombocytopenic purpura
- ☐ Antiphospholipid syndrome

Dr Assem



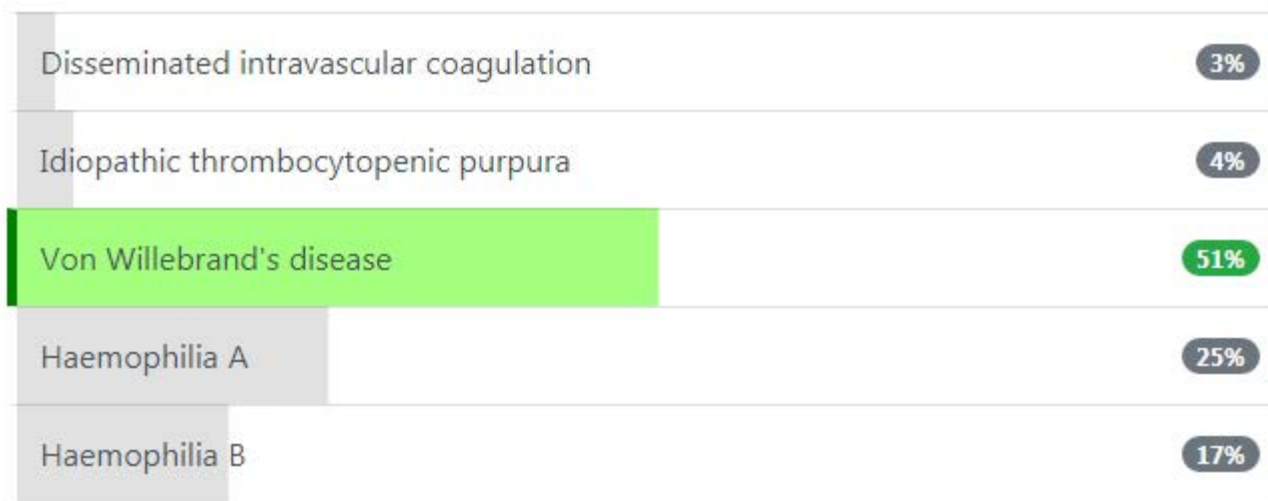
The isolated thrombocytopenia in a well patient points to a diagnosis of ITP. The combined oral contraceptive pill does not commonly cause blood dyscrasias

A 12-year-old boy is noted to bleed excessively during an elective dental extraction. Following the procedure, examination reveals petechial skin haemorrhages. Blood results show:

Hb	12.3 g/dl
Plt	$255 \times 10^9/l$
WBC	$7.9 \times 10^9/l$
PT	13.3 secs
APTT	39 secs
Factor VIII activity	87%

What is the most likely diagnosis?

- ☐ Disseminated intravascular coagulation
- ☐ Idiopathic thrombocytopenic purpura
- ☐ Von Willebrand's disease
- ☐ Haemophilia A
- ☐ Haemophilia B



The combination of a petechial skin rash combined with a slightly elevated APTT and reduced factor VIII activity make Von Willebrand's disease the most likely diagnosis

Which one of the following causes of primary immunodeficiency is due to a defect in neutrophil function?

- ☐ Wiskott-Aldrich syndrome
- ☐ Common variable immunodeficiency
- ☐ Bruton's congenital agammaglobulinaemia
- ☐ Di George syndrome
- ☐ Chronic granulomatous disease

Wiskott-Aldrich syndrome

17%

Common variable immunodeficiency

13%

Bruton's congenital agammaglobulinaemia

9%

Di George syndrome

14%

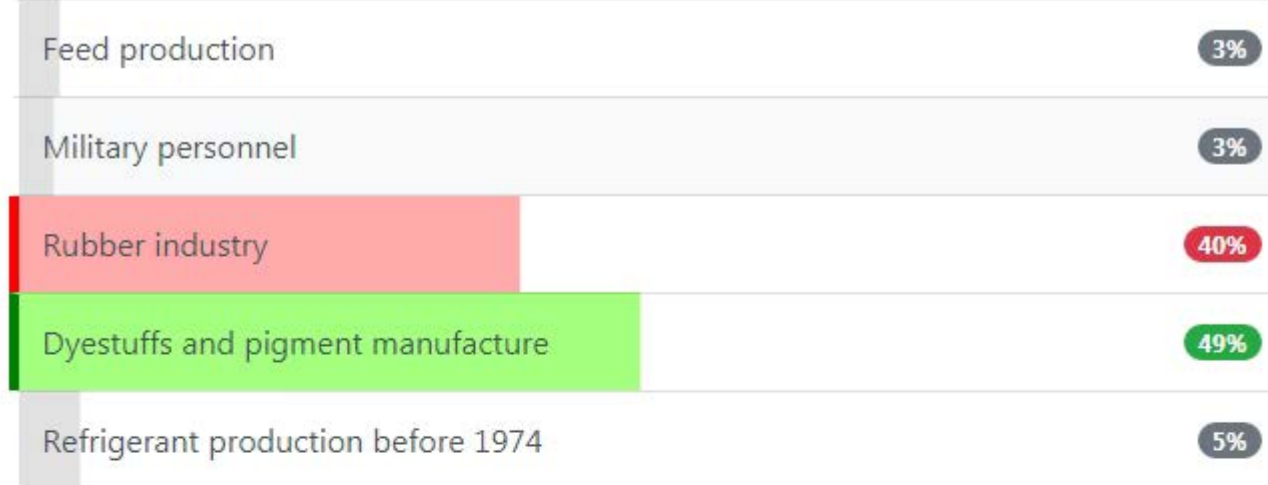
Chronic granulomatous disease

46%

A 75-year-old male patient presents to the urology clinic with a 1-month history of passing frank haematuria. A flexible cystoscopy reveals a mass of the bladder wall and the biopsy reveals transitional cell carcinoma.

Which industry was he likely to have worked in?

- ☐ Feed production
- ☐ Military personnel
- ☐ Rubber industry
- ☐ Dyestuffs and pigment manufacture
- ☐ Refrigerant production before 1974



Exposure to aniline dyes is a risk factor for transitional cell carcinoma

Important for me

Less important

Aniline dyes are used in dyestuffs and pigment manufacture. Exposure to aniline dyes is a risk factor for transitional cell carcinoma.

Feed production may expose to aflatoxin.

The military may expose to mustard gas.

Rubber industry may expose to nitrosamines.

Refrigerant production before 1974 may expose to vinyl chloride.

Which one of the following features is least associated with Waldenstrom's macroglobulinaemia?

- ☐ Cryoglobulinaemia
- ☐ Bone pain
- ☐ Retinal vein thrombosis
- ☐ Hepatosplenomegaly
- ☐ Monoclonal IgM paraproteinaemia

Cryoglobulinaemia

12%

Bone pain

52%

Retinal vein thrombosis

13%

Hepatosplenomegaly

12%

Monoclonal IgM paraproteinaemia

10%

A 68-year-old man presents to the acute medical ward following a referral from his general practitioner. The patient has experienced a 3 month history of weight loss, lethargy and malaise, accompanied by headaches and blurred vision. On examination the patient has mild splenomegaly and some minor cervical lymphadenopathy.

Initial investigations are as follows:

Hb	110 g/l
Platelets	95 * 10 ⁹ /l
WBC	14 * 10 ⁹ /l
Bilirubin	11 µmol/l
ALP	70 u/l
ALT	17 u/l
γGT	52 u/l
Albumin	20 g/l
Urinary Bence Jones protein	Positive
Skeletal survey X-rays	No lesions observed

Given these initial results and the patient's presenting symptoms, what is the most likely diagnosis?

- ☐ Acute myeloid leukaemia
- ☐ Multiple myeloma
- ☐ Burkitt's lymphoma
- ☐ Waldenstrom's macroglobulinaemia
- ☐ Myelodysplasia

Acute myeloid leukaemia

6%

Multiple myeloma

41%

Burkitt's lymphoma

5%

Waldenstrom's macroglobulinaemia

42%

Myelodysplasia

6%

Waldenstrom's macroglobulinaemia - Organomegaly with no bone lesions

Multiple myeloma - Bone lesions with no organomegaly

Important for me Less important

Differentiating between multiple myeloma and Waldenstrom's macroglobulinaemia can be difficult due to the considerable overlap seen in their presenting symptoms. However, key differences do exist.

In cases of multiple myeloma, bone pain in the hips, back or shoulders is present in the majority of patients. This kind of pain is absent in Waldenstrom's macroglobulinaemia, who usually will complain of pain secondary to hyperviscosity e.g. persistent headaches

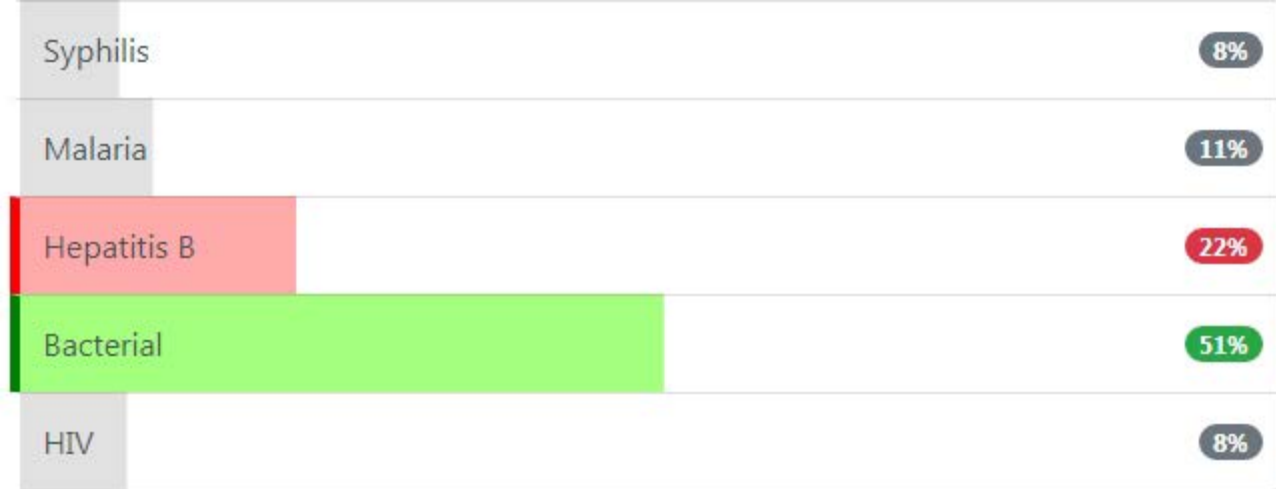
Organomegaly is also more commonly seen in Waldenstrom's macroglobulinaemia.

Bence Jones protein, although classically associated with multiple myeloma, can be present in patients with Waldenstrom's macroglobulinaemia or patients with chronic B cell lymphocytic leukaemia.

Dr Assem

Transmission of which type of infection is most likely to occur following a platelet transfusion?

- ☐ Syphilis
- ☐ Malaria
- ☐ Hepatitis B
- ☐ Bacterial
- ☐ HIV



As platelet concentrates are generally stored at room temperature they provide a more favourable environment for bacterial contamination than other blood products.

Which one of the following causes of primary immunodeficiency is due to a defect in B-cell function?

- ☐ Di George syndrome
- ☐ Chediak-Higashi syndrome
- ☐ Common variable immunodeficiency
- ☐ Chronic granulomatous disease
- ☐ Wiskott-Aldrich syndrome

Di George syndrome

15%

Chediak-Higashi syndrome

13%

Common variable immunodeficiency

44%

Chronic granulomatous disease

12%

Wiskott-Aldrich syndrome

16%

A 60-year-old man is known to have renal cell carcinoma and is currently undergoing treatment. He presents to the medical team with a one month history of worsening central lower back pain which he cannot manage with analgesia at home and which is worse at night. He has no other new symptoms. Which investigation should be performed next?

- ☐ X-ray whole spine
- ☐ CT lumbar spine
- ☐ MRI whole spine
- ☐ MRI lumbar spine
- ☐ X-ray lumbar and sacral spine

X-ray whole spine

6%

CT lumbar spine

9%

MRI whole spine

54%

MRI lumbar spine

20%

X-ray lumbar and sacral spine

11%

An MRI whole spine should be performed in a patient suspected of spinal metastases

Important for me Less important

Spinal metastases should be high on your list of differentials for this patient. He is known to have a type of cancer which readily metastasises to the bone, and has progressive back pain. He, therefore, needs urgent imaging of his spine. MRI whole spine is preferable because patients with spinal metastases often have metastases at multiple levels within the spine. Plain radiographs and CT should not be performed as they have a lower sensitivity for revealing lesions and cannot exclude cord compression.

Imaging should be performed within 1 week if there are symptoms suspicious for spinal metastases but no neurological symptoms, and within 24 hours if there are symptoms suggestive of malignant spinal cord compression.

A 40-year-old female is referred to medical assessment unit by her physician for querying thrombotic thrombocytopenic purpura (TTP) after she presented with a temperature of 38.9°C. Her subsequent urea and electrolytes showed deteriorating renal function with a creatinine 3 times greater than her baseline.

What is the underlying pathophysiology of TTP?

- ☐ Autoimmune destruction of red blood cells
- ☐ Failure to cleave von Willebrand factor normally
- ☐ Anti-bodies against von Willebrand factor
- ☐ Autoimmune destruction of platelets
- ☐ A deficiency of von Willebrand factor

Autoimmune destruction of red blood cells	6%
Failure to cleave von Willebrand factor normally	56%
Anti-bodies against von Willebrand factor	12%
Autoimmune destruction of platelets	22%
A deficiency of von Willebrand factor	5%

TTP is caused by the failure to cleave vWF normally

Important for me Less important

Patients with TTP have unusually large multimers of von Willebrand factor (vWF) in their plasma. Patients with TTP lack a plasma protease that is responsible for the breakdown of these ultra-large vWF multimers. See notes below.

Autoimmune destruction of red blood cells is a form of autoimmune hemolytic anaemia and is not the correct answer in this scenario.

Autoimmune destruction of platelets is seen in idiopathic thrombocytopenic purpura (ITP).

A deficiency of von Willebrand factor (vWF) is seen in von Willebrand disease, a genetic disorder.

Anti-bodies against vWF is incorrect.

Dr Assem

A 35-year-old woman who is 16 weeks pregnant has attended the acute medical unit after her first seizure. Her pregnancy has been uncomplicated thus far. Her temperature is 39.4°C, pulse rate 86, blood pressure 125/86 mmHg. Bloods are as follows:

Hb	69 g/l
Platelets	$43 \times 10^9/l$
WBC	$7.4 \times 10^9/l$

Na ⁺	137 mmol/l
K ⁺	4.9 mmol/l
Urea	18 mmol/l
Creatinine	278 μ mol/l

Urine dip was negative for protein and ketones. The laboratory phone you to inform you schistocytes have been seen on the blood film.

Which of these best describes the pathogenesis of this condition?

- ☐ Dysregulation of coagulation and fibrinolysis, resulting in widespread clotting
- ☐ An acquired inhibition of ADAMTS13, preventing the cleavage of von Willebrand Factor multimers
- ☐ Bacterial toxin initiation of apoptosis and thrombogenesis
- ☐ Abnormal placental perfusion and vascularisation
- ☐ Parasitic infiltration of red blood cells

Dysregulation of coagulation and fibrinolysis, resulting in widespread clotting

25%

An acquired inhibition of ADAMTS13, preventing the cleavage of von Willebrand Factor multimers

40%

Bacterial toxin initiation of apoptosis and thrombogenesis

10%

Abnormal placental perfusion and vascularisation

11%

Parasitic infiltration of red blood cells

14%

Acquired inhibition of the protein ADAMTS13 which cleaves vWF multimers is the most common cause of TTP

Important for me Less important

This woman has presented with the classical pentad of thrombotic thrombocytopenic purpura - fever, neurological dysfunction, evidence of haemolysis (blood film), renal injury and thrombocytopenia.

Acquired inability to cleave vWF multimers is the most common cause of TTP. This can occasionally be prompted by pregnancy. This results in platelet deposition and widespread coagulation. ADAMTS13 is the protein responsible for this cleavage and can be inhibited by numerous causes. A congenital deficiency in this protein is a rare cause (Upshaw-Schulman Syndrome).

1 - Describes disseminated intravascular coagulation. This has a similar haemolytic picture, but fever, neurological dysfunction and AKI are less common.

3 - Describes haemolytic-uraemic syndrome which is classically associated with E coli O:157; however no prodromal history of diarrhoea is mentioned. The blood results would however be rather similar.

4 - Describes pre-eclampsia. This can cause both seizures (eclampsia) and a microangiopathic haemolytic anaemia. However, it would be uncommon to occur so early in pregnancy. a negative urine dip also suggests this is not the diagnosis.

5 - This is malaria. Whilst it can also cause haemolysis, it is uncommon for it to do so with this history. For malaria to be severe enough to cause seizures, one would expect the blood film to show some parasites and not just schistocytes.



Discuss (3)

Improve

A 68-year-old man presents with lymphadenopathy. On examination you note splenomegaly. Investigations reveal:

Hb	125 g/l
Ca ²⁺	2.34 mmol/l
Creatinine	101 µmol/l

Further investigations reveal an IgM paraprotein of 40 g/L and skeletal survey shows no bone lesions.

What is the most likely diagnosis?

- ☐ Acute myeloid leukaemia
- ☐ Monoclonal gammopathy of unknown significance
- ☐ Chronic lymphocytic leukaemia
- ☐ Waldenstrom's macroglobulinaemia
- ☐ Myeloma

Acute myeloid leukaemia

3%

Monoclonal gammopathy of unknown significance

18%

Chronic lymphocytic leukaemia

5%

Waldenstrom's macroglobulinaemia

66%

Myeloma

8%

A paraproteinaemia is most often seen in myeloma, although a few other lymphoproliferative disorders can be associated with this. In this case, the patient most likely has a type of lymphoma (lymphoplasmacytic lymphoma) producing excess IgM. Collectively the syndrome is called Waldenstrom's macroglobulinaemia, which usually also presents with bone marrow infiltration, splenomegaly and sometimes lymphadenopathy. In contrast to myeloma it does not cause lytic bone lesions or hypercalcaemia. Further evidence against myeloma would be the nature of the paraprotein. A true IgM myeloma is very rare (IgG, IgA, and IgD being much more common). To fulfill the diagnostic criteria for monoclonal gammopathy of unknown significance, patients must have a monoclonal paraprotein band lesser than 30 g/L.

A 77-year-old man with a history of chronic lymphocytic leukaemia is admitted to the Acute Medical Unit with pneumonia. This is his fourth admission for pneumonia in the past six months. Which one of the following factors is most likely to be responsible?

- ☐ Hypersplenism
- ☐ Decreased lymphocyte survival
- ☐ Hypogammaglobulinaemia
- ☐ Transformation to high-grade lymphoma
- ☐ Immature lymphocytes

A 77-year-old man with a history of chronic lymphocytic leukaemia is admitted to the Acute Medical Unit with pneumonia. This is his fourth admission for pneumonia in the past six months. Which one of the following factors is most likely to be responsible?

Hypersplenism

7%

Decreased lymphocyte survival

7%

Hypogammaglobulinaemia

59%

Transformation to high-grade lymphoma

7%

Immature lymphocytes

20%

Which one of the following is least associated with lead poisoning?

- ☐ Peripheral neuropathy
- ☐ Acute glomerulonephritis
- ☐ Blue lines on gum margin
- ☐ Abdominal pain
- ☐ Microcytic anaemia

Which one of the following is least associated with lead poisoning?

Peripheral neuropathy

9%

Acute glomerulonephritis

55%

Blue lines on gum margin

8%

Abdominal pain

6%

Microcytic anaemia

22%

A 52-year-old man with a history of anaemia and abdominal discomfort is diagnosed as having chronic myeloid leukaemia. What is the mechanism of action of imatinib?

- ☐ EGF receptor antagonist
- ☐ Tyrosine kinase inhibitor
- ☐ Anti-CD52 monoclonal antibody
- ☐ Anti-CD23 monoclonal antibody
- ☐ p53 inhibitor

A 52-year-old man with a history of anaemia and abdominal discomfort is diagnosed as having chronic myeloid leukaemia. What is the mechanism of action of imatinib?

EGF receptor antagonist

4%

Tyrosine kinase inhibitor

81%

Anti-CD52 monoclonal antibody

6%

Anti-CD23 monoclonal antibody

6%

p53 inhibitor

4%

Chronic myeloid leukaemia - imatinib = tyrosine kinase inhibitor

Important for me Less important

Imatinib is an inhibitor of the tyrosine kinase associated with the BCR-ABL defect

A 72-year-old woman is admitted with confusion and pallor. Her daughter reports that she has been getting more confused and tired for the past three months. Blood tests are reported as follows:

Hb	89 g/l
MCV	125 fl
Plt	$148 \times 10^9/l$
WBC	$4.4 \times 10^9/l$

In light of the macrocytic anaemia some further tests are ordered:

Intrinsic factor antibodies	Negative
Vitamin B12	94 ng/l (200-900 ng/l)
Folic acid	1.1 nmol/l (> 3.0 nmol/l)

What is the most appropriate management?

- ☐ Oral folic acid + blood transfusion
- ☐ Oral folic acid + start Intramuscular vitamin B12 when folic acid levels are normal
- ☐ Intramuscular vitamin B12 + start oral folic acid when vitamin B12 levels are normal
- ☐ Blood transfusion
- ☐ Oral prednisolone

Oral folic acid + blood transfusion

3%

Oral folic acid + start Intramuscular vitamin B12 when folic acid levels are normal

21%

Intramuscular vitamin B12 + start oral folic acid when vitamin B12 levels are normal

71%

Blood transfusion

3%

Oral prednisolone

3%

It is important in a patient who is also deficient in both vitamin B12 and folic acid to treat the B12 deficiency first to avoid precipitating subacute combined degeneration of the cord

Dr. Abou

A 56-year-old man is investigated for lethargy. A full blood count shows the following:

Hb	8.6 g/dl
Platelets	$42 \times 10^9/l$
WBC	$36.4 \times 10^9/l$
	Blood film shows 30% myeloid blasts with Auer rods - please liaise with haematologist

Given the likely diagnosis, which one of the following is associated with a good prognosis?

- ☐ Translocation between chromosome 9 and 14
- ☐ Translocation between chromosome 15 and 17
- ☐ 25% blast following first course of chemotherapy
- ☐ Deletion of chromosome 5
- ☐ Deletion of chromosome 7

Translocation between chromosome 9 and 14

15%

Translocation between chromosome 15 and 17

56%

25% blast following first course of chemotherapy

13%

Deletion of chromosome 5

10%

Deletion of chromosome 7

6%

Acute myeloid leukaemia - good prognosis: t(15;17)

Important for me Less important

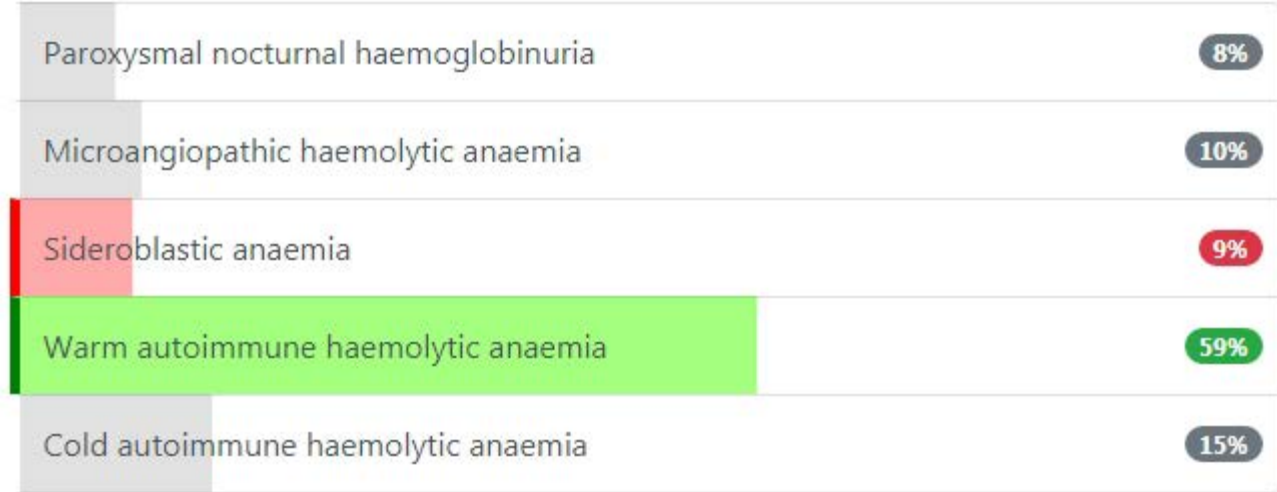
A translocation between chromosome 15 and 17 is seen in acute promyelocytic leukaemia, which is known to carry a good prognosis.

A 74-year-old woman with a past history of chronic lymphocytic leukaemia presents with lethargy. The following blood results are obtained:

Hb	7.9 g/dl
Plt	$158 \times 10^9/l$
WCC	$24.0 \times 10^9/l$
Blood film:	normochromic, normocytic anaemia

What complication has most likely occurred?

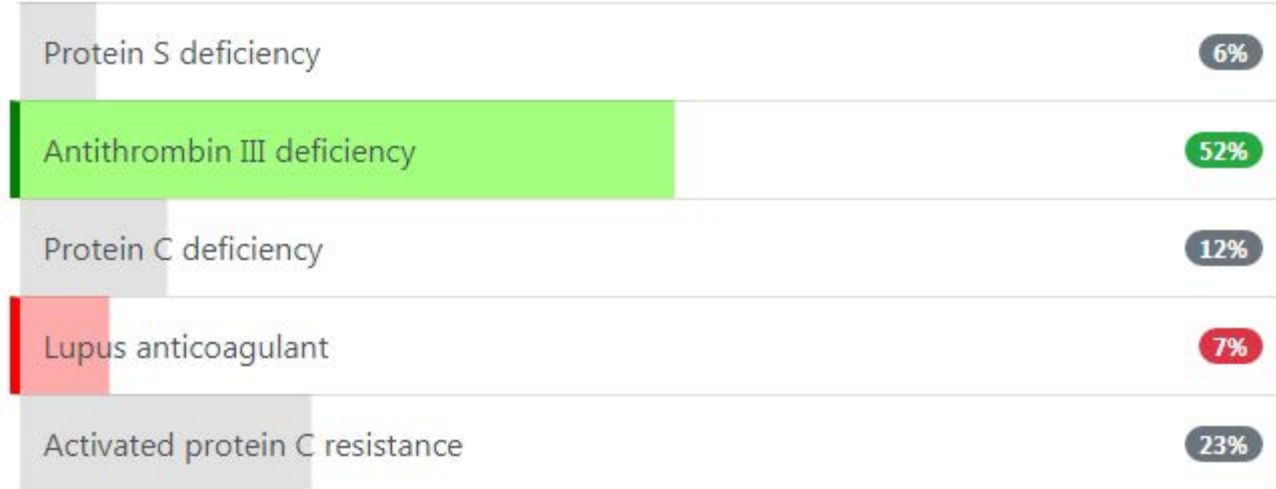
- ☐ Paroxysmal nocturnal haemoglobinuria
- ☐ Microangiopathic haemolytic anaemia
- ☐ Sideroblastic anaemia
- ☐ Warm autoimmune haemolytic anaemia
- ☐ Cold autoimmune haemolytic anaemia



Warm autoimmune haemolytic anaemia occurs in around 10-15% of patients with chronic lymphocytic leukaemia

A patient with a history of recurrent thromboembolic events develops a deep vein thrombosis despite full anticoagulation with heparin. Which one of the following causes of thrombophilia is associated with resistance to heparin?

- ☐ Protein S deficiency
- ☐ Antithrombin III deficiency
- ☐ Protein C deficiency
- ☐ Lupus anticoagulant
- ☐ Activated protein C resistance



Heparin works by binding to antithrombin III, enhancing its anticoagulant effect by inhibiting the formation of thrombin and other clotting factors. Patients with antithrombin III deficiency may therefore be resistant to heparin treatment

A 28-year-old gentleman was diagnosed with Hodgkin's lymphoma after presenting to his GP with painless lymphadenopathy. Following a staging positron emission tomography (PET) scan, nodes involving both sides of the diaphragm were found. Which stage of the Ann-Arbor classification does his presentation fall under?

☐ Stage I

☐ Stage II

☐ Stage III

☐ Stage IV

☐ Stage V



Stage III of the Ann-Arbor clinical staging of lymphomas involve lymph nodes on both sides of the diaphragm

Important for me Less important

The Ann-Arbor classification is used for Hodgkin's lymphoma and is split into 4 stages according to the spread of the disease.

Stage I - involves a single regional lymph node

Stage II - involves two or more lymph nodes on one side of the diaphragm

Stage IV - distant spread involving one or more extra lymphatic organs

Stage V - Not part of the Ann-Arbor classification

Which of the following is a good prognostic factor in chronic lymphocytic leukaemia?

- ☐ Female sex
- ☐ Lymphocyte doubling time < 12 months
- ☐ CD38 expression positive
- ☐ Age > 70 years
- ☐ Raised LDH

Female sex

46%

Lymphocyte doubling time < 12 months

17%

CD38 expression positive

22%

Age > 70 years

9%

Raised LDH

7%

A 10-year-old boy is referred to you following his 7th course of antibiotics for lower respiratory tract infection in the last 6 years. He has difficult to control eczema for which he is currently on a topical steroid cream. His bloods are as follows

Hb	139 g/l
Platelets	$65 \times 10^9/l$
WBC	$12.3 \times 10^9/l$

In which of the following genes may you expect to see an abnormality?

☐ WASP

☐ PKD1

☐ CFTR

☐ HFE1

☐ RET



The combination of frequent infections, eczema and thrombocytopenia are characteristic of the Wiskott-Aldrich syndrome, which is caused by an abnormality in the WASP gene.

The PKD1 gene is associated with polycystic kidney disease, CFTR with cystic fibrosis, HFE1 with haemochromatosis and RET an oncogene associated with multiple endocrine neoplasia and also Hirschsprung's disease.

Which electrolyte disturbance is cisplatin most associated with?

- ☐ Hypocalcaemia
- ☐ Hyponatraemia
- ☐ Hypomagnesaemia
- ☐ Hypokalaemia
- ☐ Hypercalcaemia

Hypocalcaemia

12%

Hyponatraemia

8%

Hypomagnesaemia

59%

Hypokalaemia

10%

Hypercalcaemia

11%

Cisplatin is associated with hypomagnesaemia

Important for me Less important

A 29-year-old woman who has a history of recurrent pulmonary emboli is identified as having factor V Leiden. How does this particular inherited thrombophilia increase her risk of venous thromboembolic events?

- ☐ Decreased levels of factor V
- ☐ Increased levels of factor V
- ☐ Activated factor V is inactivated much more slowly by activated protein C
- ☐ Activated factor V is inactivated much more quickly by activated protein C
- ☐ Decreased antithrombin III levels

Decreased levels of factor V

11%

Increased levels of factor V

5%

Activated factor V is inactivated much more slowly by activated protein C

58%

Activated factor V is inactivated much more quickly by activated protein C

16%

Decreased antithrombin III levels

10%

In patients with factor V Leiden, activated factor V is inactivated 10 times more slowly by activated protein C than normal

Important for me Less important

Which one of the following translocations is associated with acute promyelocytic leukaemia?

☐ t(15;17)

☐ t(9;17)

☐ t(9;22)

☐ t(15;22)

☐ t(17;22)

t(15;17)

69%

t(9;17)

5%

t(9;22)

11%

t(15;22)

8%

t(17;22)

6%

Acute promyelocytic leukaemia - t(15;17)

Important for me Less important

A 39-year-old woman presents with a strange collection of symptoms over the past six months. She has been seen by multiple specialists, none of whom have been able to find a cause for her symptoms.

Her symptoms include worsening headaches, memory loss, low mood, lethargy, abdominal pain causing paroxysms of intermittent generalised pain, nausea, an unusual taste in her mouth and paraesthesia in her extremities.

She is irritable during your consultation and at times tearful complaining that no one is taking her seriously and confiding that her General Practitioner had referred her for counselling.

Routine blood tests show:

Hb	101g/L
WBC	5.6 $10^9/L$
Platelets	350 $10^9/L$
MCV	77fL
Na	136mmol/L
K	4.3mmol/L
Urea	18.2mmol/L
Creatinine	408umol/L

What is the likely cause of her symptoms?

- ☐ Pick's disease
- ☐ Hepatic encephalopathy
- ☐ Lead poisoning
- ☐ Early-onset Alzheimer's
- ☐ Viral encephalitis

Pick's disease	16%
Hepatic encephalopathy	3%
Lead poisoning	78%
Early-onset Alzheimer's	2%
Viral encephalitis	2%

Lead poisoning is often occupational and comprises gastrointestinal and neuropsychiatric symptoms and anaemia due to interruption to the haem biosynthetic pathway.

Important for me Less important

It is important to keep lead poisoning in mind as a differential, particularly in someone for whom routine investigations are not providing an answer and who clearly has abnormal pathology (demonstrated by her kidney failure and microcytic anaemia).

It can cause a varied and often non-specific array of symptoms. Some more 'classical' features include an unusual taste in the mouth and paraesthesia of the extremities.

Questions may more obviously point to the route of exposure through industrial exposure or contact with lead-based products such as paint or contaminated water.

A 79-year-old female with a history of COPD and metastatic lung cancer is admitted with increasing shortness of breath. Following discussion with family it is decided to withdraw active treatment, including fluids and antibiotics, as the admission likely represents a terminal event. Two days after admission she becomes agitated and restless. What is the most appropriate management?

- ☐ Subcutaneous midazolam
- ☐ Intramuscular haloperidol
- ☐ Oral lorazepam
- ☐ Oral haloperidol
- ☐ Recommence fluids and antibiotics

Subcutaneous midazolam

55%

Intramuscular haloperidol

21%

Oral lorazepam

4%

Oral haloperidol

13%

Recommence fluids and antibiotics

6%

A 64-year-old female is brought to the Emergency Department by her family, who are concerned about her increasing confusion over the past 2 days. On examination she is found to be pyrexial at 38°C. Blood tests reveal:

Hb	9.6 g/dl
Platelets	$65 \times 10^9/l$
WCC	$11.1 \times 10^9/l$
Urea	23.1 mmol/l
Creatinine	366 $\mu\text{mol/l}$

What is the most likely diagnosis?

- ☐ Wegener's granulomatosis
- ☐ Thrombotic thrombocytopenic purpura
- ☐ Haemolytic uraemic syndrome
- ☐ Idiopathic thrombocytopenic purpura
- ☐ Rapidly progressive glomerulonephritis

Wegener's granulomatosis

4%

Thrombotic thrombocytopenic purpura

61%

Haemolytic uraemic syndrome

24%

Idiopathic thrombocytopenic purpura

6%

Rapidly progressive glomerulonephritis

5%

HUS or TTP? Neuro signs point towards TTP

Important for me Less important

The combination of neurological features, renal failure, pyrexia and thrombocytopenia point towards a diagnosis of thrombotic thrombocytopenic purpura

A 21-year-old man attends the emergency department after noticing blood in his urine. He has been feeling fatigued and generally unwell for the last two days and has been finding himself getting out of breath easily. His housemates had commented yesterday that he was 'turning yellow', but he had assumed they were teasing him for being unwell and had ignored them.

He is normally fit and well and is not on any regular medications. He has however recently started taking primaquine in preparation for a volunteering trip to Tanzania next week.

On examination, he is clearly jaundiced and tachypnoeic. His urine sample is a dark brown and is positive for blood and bilirubin. He is afebrile and normotensive, though is requiring some supplemental oxygen.

You are awaiting the rest of his test results but have received the following from the lab so far:

Hb	115 g/l
MCV	90 fL
Haematocrit	0.3 L/L
Platelets	$250 \times 10^9/l$
WBC	$10.2 \times 10^9/l$
Reticulocyte count	2.1%
Peripheral blood film	Presence of schistocytes, spherocytes and bite cells noted

What is the most likely reason for this presentation?

- ☐ Sickle cell crisis
- ☐ Post-infectious haemolytic anaemia
- ☐ G6PD deficiency
- ☐ Hereditary spherocytosis
- ☐ Pyruvate kinase deficiency

Dr Assem

Sickle cell crisis

5%

Post-infectious haemolytic anaemia

6%

G6PD deficiency

69%

Hereditary spherocytosis

16%

Pyruvate kinase deficiency

5%

Malaria prophylaxis (e.g. primaquine) can trigger haemolytic anaemia in those with G6PD deficiency

Important for me Less important

This man is presenting with signs and symptoms of a haemolytic anaemia, the most likely cause of which is G6PD deficiency. A number of foods and medications can trigger haemolysis in individuals with G6PD deficiency, an important class of which are quinine-based anti-malarial medications. The temporal link between starting malaria prophylaxis and developing signs of haemolysis makes this the most likely cause.

While a sickle cell crisis can trigger haemolysis, there is nothing to suggest this patient has sickle cell disease, and no sickle cells are present on the blood film.

Post-infectious haemolysis can occur with atypical pneumonias such as *Mycoplasma* (cold-agglutinin disease) and infections that induce hypersplenism such as mononucleosis. There is nothing to suggest an infectious cause in this scenario, however.

Congenital haemoglobin defects such as spherocytosis can also cause haemolysis. While there are spherocytes on this man's blood film, these are present to different degrees in haemolytic anaemias of any cause and as such are not specific.

Pyruvate kinase deficiency is the next most common inherited metabolic disorder after G6PD deficiency. Haemolysis in these patients tends to be triggered in times of significant physiological stress.

Which of the following is deficient in patients with hereditary angioedema?

☐ C1-INH

☐ C3

☐ Heat shock protein type 1

☐ C6

☐ Histamine degradation protein (HDP)

C1-INH

73%

C3

11%

Heat shock protein type 1

4%

C6

3%

Histamine degradation protein (HDP)

9%

Hereditary angioedema - C1-INH deficiency

Important for me

Less important

A 67-year-old man with lung cancer is currently taking MST 30mg bd for pain relief. What dose of oral morphine solution should he be prescribed for breakthrough pain?

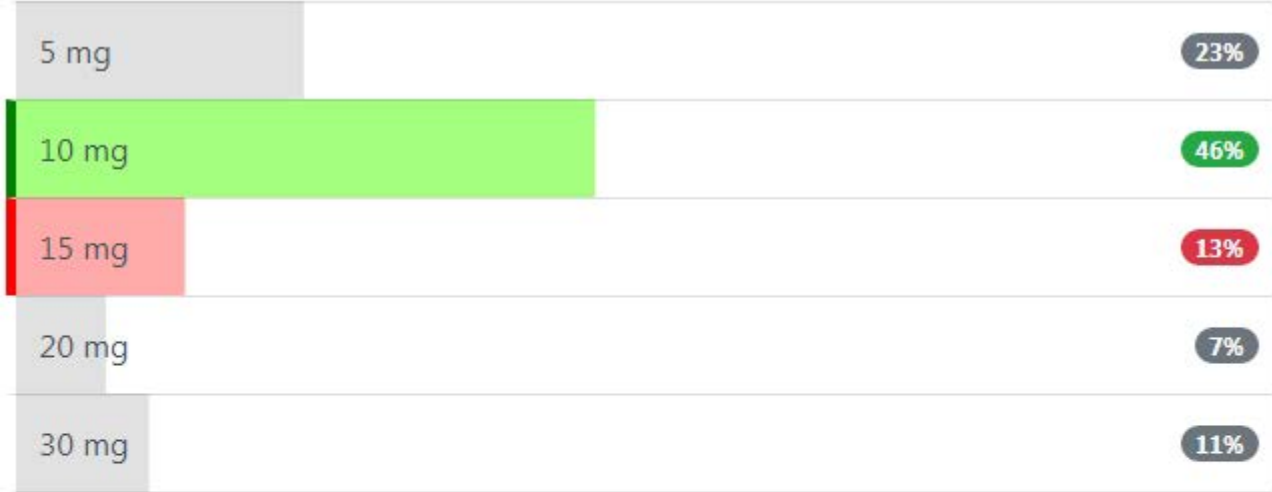
☐ 5 mg

☐ 10 mg

☐ 15 mg

☐ 20 mg

☐ 30 mg



Breakthrough dose = 1/6th of daily morphine dose

Important for me Less important

The total daily morphine dose is $30 \times 2 = 60$ mg, therefore the breakthrough dose should be one-sixth of this, 10 mg

A 18-year-old man who is known to have hereditary spherocytosis is admitted to hospital with lethargy. Admission bloods show the following:

Hb	4.7 g/dl
Retics	0.3%

What is the most likely explanation for these findings?

- ☐ Haemolytic crisis
- ☐ Recent ciprofloxacin therapy
- ☐ Parvovirus infection
- ☐ Sequestration crises
- ☐ Angiodysplastic bowel lesions

Haemolytic crisis

19%

Recent ciprofloxacin therapy

4%

Parvovirus infection

59%

Sequestration crises

16%

Angiodysplastic bowel lesions

3%

This man has had an aplastic crisis secondary to parvovirus infection.

A 40-year-old female has been diagnosed with haemolytic uraemic syndrome after an episode of severe diarrhoea. She has a haemoglobin of 84 mg/dL. Which of the following blood results is most likely to be found?

- ☐ Low haptoglobin
- ☐ Low bilirubin
- ☐ Elevated magnesium
- ☐ Low urea
- ☐ Increased HbF

Low haptoglobin	71%
Low bilirubin	4%
Elevated magnesium	10%
Low urea	4%
Increased HbF	11%

Low haptoglobin levels are found in haemolytic anaemias

Important for me [Less important](#)

The patient has an intravascular haemolytic anaemia secondary to haemolytic uraemic syndrome. Haptoglobin levels are reduced in intravascular haemolysis because they bind to free haemoglobin released from lysed erythrocytes. The complexes are then removed from the plasma by the hepatic reticulo-endothelial cells. Haptoglobin levels decrease if the rate of haemolysis is greater than the rate of haptoglobin production.

Bilirubin levels are likely to be elevated because of increased metabolism of haem. Magnesium may be low because of diarrhoea or unaffected. Urea would be increased due to acute kidney injury. HbF is found in patients with inherited haemoglobinopathies and not in acquired haemolytic anaemias.

A 54-year-old man is investigated for a chronic cough. A chest x-ray arranged by his GP shows a suspicious lesion in the right lung. He has no past history of note and is a life-long non-smoker. An urgent bronchoscopy is arranged which is normal. What is the most likely diagnosis?

- ☐ Lung sarcoma
- ☐ Squamous cell lung cancer
- ☐ Lung adenocarcinoma
- ☐ Small cell lung cancer
- ☐ Lung carcinoid

Lung sarcoma

6%

Squamous cell lung cancer

11%

Lung adenocarcinoma

54%

Small cell lung cancer

14%

Lung carcinoid

15%

Lung adenocarcinoma

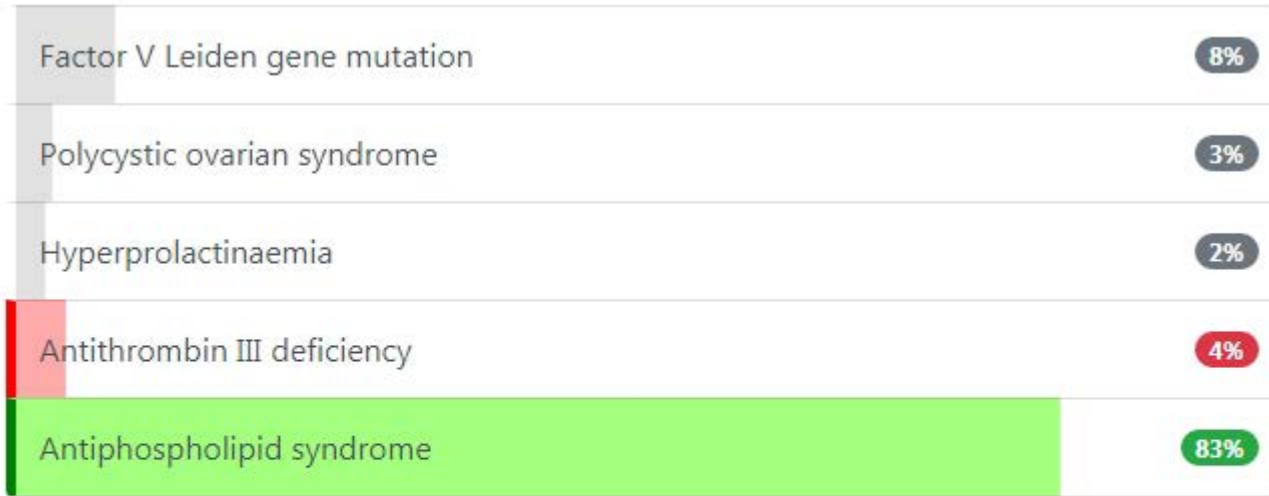
- most common type in non-smokers
- peripheral lesion

Important for me Less important

The clues are the absence of a smoking history and normal bronchoscopy, which suggests a peripherally located lesion.

Which one of the following is the most common cause of recurrent first trimester spontaneous miscarriage?

- ☐ Factor V Leiden gene mutation
- ☐ Polycystic ovarian syndrome
- ☐ Hyperprolactinaemia
- ☐ Antithrombin III deficiency
- ☐ Antiphospholipid syndrome



Antiphospholipid antibodies (aPL) are present in 15% of women with recurrent miscarriage, but in comparison, the prevalence of aPL in women with a low risk obstetric history is less than 2%

Dr. Arsem

A 54-year-old lady presents with shortness of breath, distended neck veins, and a swollen and red face. She had She undergoes a CT scan of her chest demonstrating obstruction of the superior vena cava (SVC). What is the most likely cause?

- ☐ Fibrosing mediastinitis
- ☐ Thrombosis
- ☐ Syphilitic thoracic aortic aneurysm
- ☐ Primary malignancy
- ☐ Metastatic malignancy

Fibrosing mediastinitis	4%
Thrombosis	8%
Syphilitic thoracic aortic aneurysm	4%
Primary malignancy	52%
Metastatic malignancy	32%

The correct answer is a primary malignancy. Intrathoracic malignancy is responsible for up to 60-85% of SVC obstruction cases. Most common is non-small cell lung cancer, small cell lung cancer and non-Hodgkin lymphoma. Together these malignancies represent 95% of SVC syndromes caused by malignancy. This can be the presenting feature of a undiagnosed tumour. Thrombosis can occur following pacemaker wire insertion and central line placement. Syphilitic thoracic aortic aneurysm and fibrosing mediastinitis used to be common causes prior to widespread antibiotic use.

Source:

'Superior Vena Cava Syndrome.' BMJ Best Practice. 20 July 2016.

Which one of the following statements regarding the aetiology of venous thromboembolism (VTE) is correct?

- Third generation combined oral contraceptive pills are safer than second generation ones
- VTE develops in around 5% of patients with Goodpasture's syndrome
- Female gender is a risk factor recurrent VTE
- The second trimester of pregnancy is associated with a greater risk than the puerperium
- Tamoxifen therapy increases the risk of VTE

Third generation combined oral contraceptive pills are safer than second generation ones

16%

VTE develops in around 5% of patients with Goodpasture's syndrome

4%

Female gender is a risk factor recurrent VTE

13%

The second trimester of pregnancy is associated with a greater risk than the puerperium

6%

Tamoxifen therapy increases the risk of VTE

60%

Which one of the following may be associated with an increased risk of venous thromboembolism?

- ☐ Fluoxetine
- ☐ Selegiline
- ☐ Diazepam
- ☐ Amitriptyline
- ☐ Olanzapine

Fluoxetine

14%

Selegiline

10%

Diazepam

2%

Amitriptyline

7%

Olanzapine

67%

Dr Assem

What is the most common inherited bleeding disorder?

- ☐ Haemophilia A
- ☐ Activated protein C resistance
- ☐ Haemophilia B
- ☐ Antithrombin III deficiency
- ☐ von Willebrand's disease

Haemophilia A

12%

Activated protein C resistance

14%

Haemophilia B

3%

Antithrombin III deficiency

4%

von Willebrand's disease

66%

Dr Assem

A 32-year-old male presents to your clinic for review. He has a history of hereditary spherocytosis and recently underwent splenectomy. Since the operation he's noticed a major improvement in his energy levels.

If a blood film was taken from the patient, what new histological finding would be observed which would have been absent prior to splenectomy?

- ☐ Schistocytes
- ☐ Bite cells
- ☐ Heinz bodies
- ☐ Spherocytes
- ☐ Howell-Jolly bodies

Schistocytes	5%
Bite cells	4%
Heinz bodies	9%
Spherocytes	8%
Howell-Jolly bodies	73%

Howell-Jolly bodies are present in hereditary spherocytosis post-splenectomy

Important for me Less important

Howell-Jolly bodies are remnants of the red blood cell (RBC) nucleus which are normally removed by the spleen. Post-splenectomy these Howell-Jolly bodies persist and can be observed on histology.

Spherocytes would also be present. However, they would have been observed on histology prior to splenectomy.

Schistocytes are sheared RBCs seen in microangiopathic haemolytic anaemia.

Heinz bodies and bite cells are characteristic of glucose-6-phosphate dehydrogenase (G6PD) deficiency.

A 68-year-old man who takes warfarin for atrial fibrillation is taken to the emergency department after being involved in a road traffic accident. His GCS is reduced and a CT head shows an intracranial haemorrhage. Bloods on admission show the following:

Hb	13.2 g/l
Platelets	$222 \times 10^9/l$
WBC	$11.2 \times 10^9/l$
INR	3.1

In addition to vitamin K, which one of the following blood products should be given?

- ☐ Cryoprecipitate
- ☐ Platelet transfusion
- ☐ Prothrombin complex concentrate
- ☐ Packed red cells
- ☐ Fresh frozen plasma (FFP)

Cryoprecipitate

8%

Platelet transfusion

2%

Prothrombin complex concentrate

72%

Packed red cells

2%

Fresh frozen plasma (FFP)

17%

Prothrombin complex concentrate is used for the emergency reversal of anticoagulation in patients with severe bleeding or a head injury

Important for me Less important

A 64-year-old man is reviewed in the haematology clinic. Which one of the following features would suggest that a diagnosis monoclonal gammopathy of undetermined significance is more likely than myeloma?

- ☐ Bone pain
- ☐ IgG paraprotein band = 18g/l
- ☐ Creatinine = 160 $\mu\text{mol/l}$
- ☐ Raised beta-2 microglobulin
- ☐ Lytic lesions on x-ray

Bone pain

5%

IgG paraprotein band = 18g/l

61%

Creatinine = 160 μ mol/l

6%

Raised beta-2 microglobulin

23%

Lytic lesions on x-ray

4%

Paraproteinaemia is seen in both myeloma and monoclonal gammopathy of undetermined significance (MGUS) - at this level a diagnosis of MGUS is more likely. The other features indicate myeloma

A 51-year-old female is referred to the haematology clinic with a haemoglobin of 19.2 g/dl. She is a non-smoker. Her oxygen saturations on room air are 98% and she is noted to have mass in the left upper quadrant. What is the most useful test to establish whether she has polycythaemia vera?

- ☐ Bone marrow aspiration
- ☐ Blood film
- ☐ Red cell mass
- ☐ Transferrin saturation
- ☐ JAK2 mutation screen

Bone marrow aspiration

5%

Blood film

6%

Red cell mass

13%

Transferrin saturation

5%

JAK2 mutation screen

70%

Polycythaemia rubra vera - JAK2 mutation

Important for me [Less important](#)

The discovery of the JAK2 mutation has made red cell mass a second-line investigation for patients with suspected JAK2-negative polycythaemia vera

A 60-year-old woman develops a deep vein thrombosis (DVT) 10 days after having a hip replacement despite taking prophylactic dose low-molecular weight heparin (LMWH). She has no significant past medical history of note other than osteoarthritis. After being diagnosed she is started on treatment dose LMWH. What is the most appropriate anticoagulation strategy?

- ☐ Continue on treatment dose LMWH for 6 weeks
- ☐ Continue on treatment dose LMWH for 3 months
- ☐ Continue on treatment dose LMWH for 6 months
- ☐ Switch to warfarin for 3 months
- ☐ Switch to warfarin for 6 months

Continue on treatment dose LMWH for 6 weeks

6%

Continue on treatment dose LMWH for 3 months

16%

Continue on treatment dose LMWH for 6 months

13%

Switch to warfarin for 3 months

47%

Switch to warfarin for 6 months

18%

Venous thromboembolism - length of warfarin treatment

- provoked (e.g. recent surgery): 3 months
- unprovoked: 6 months

Important for me Less important

The recent surgery is an obvious 'provoking' factor for the DVT. She should therefore be anticoagulated for 3 months.

A 4-year-old child with a deforming mandibular neck swelling. Biopsy of the lesion reveals a 'starry sky' appearance under microscopy.

Infection with which virus is an essential step in the pathogenesis of this disease?

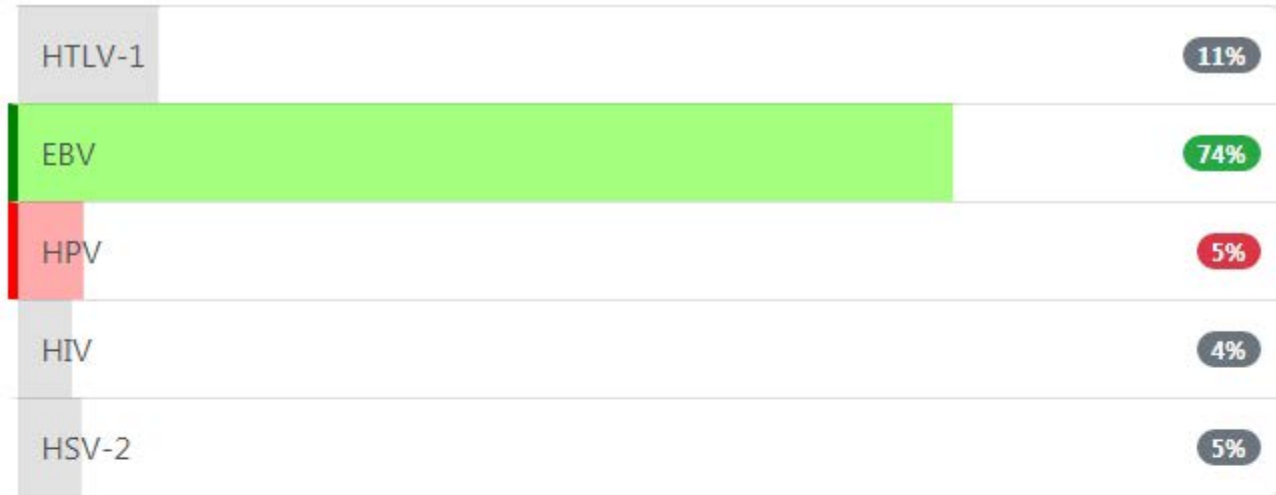
☐ HTLV-1

☐ EBV

☐ HPV

☐ HIV

☐ HSV-2



EBV infection is implicated in the pathogenesis of Burkitt's lymphoma

Important for me [Less important](#)

EBV is identifiable in nearly all cases of Burkitt's lymphoma.

HTLV-1 is associated with adult T cell lymphoma

HPV is associated with cervical and anal cancers

HIV infection is important in the pathogenesis of immunodeficiency-associated Burkitt's lymphoma. However, in the endemic variant clearly described here the disease may occur in HIV negative children.

HSV-2 causes genital herpes

A 46-year-old woman presents to her GP with a 2-month history of increasing tiredness and fatigue. She has also noticed that she has been getting more short of breath recently. Her past medical history includes two urinary tract infections in the past year and lower back pain for which she takes paracetamol. She does not take any other medications. On examination, she is pale. The GP orders some baseline blood tests:

Hb	101 g/l	(115–165 g/L)
MCV	88.1 fL	(80–100 fL)
Platelets	129 * 10 ⁹ /l	(140–400 * 10 ⁹ /l)
ESR	114 mm/h	(3–9 mm/h)
WBC	3.2 * 10 ⁹ /l	(4.0–11.0 * 10 ⁹ /l)

Na ⁺	137 mmol/l	(135–145mmol/l)
K ⁺	4.9 mmol/l	(3.5–5mmol/l)
Urea	10 mmol/l	(2.5–6.7mmol/l)
Creatinine	108 µmol/l	(45–90µmol/l)
eGFR	50 ml/min/1.73m ²	(>90 ml/min/1.73m ²)
Ca ²⁺	2.9 mmol/L	(2.12–2.65mmol/L)

What is the next most appropriate investigation?

- ☒ Renal ultrasound scan
- ☐ Cervical lymph node biopsy
- ☐ PTH levels
- ☐ CT KUB
- ☐ Serum electrophoresis

Renal ultrasound scan	7%
Cervical lymph node biopsy	7%
PTH levels	14%
CT KUB	8%
Serum electrophoresis	64%

'CRAB' features of multiple myeloma = hyperCalcaemia, Renal failure, Anaemia (and thrombocytopenia) and Bone fractures/lytic lesions

Important for me Less important

The combination of the history, examination findings and blood test results point towards a diagnosis of multiple myeloma. This patient is demonstrating evidence of all four features of multiple myeloma:

- C - hypercalcaemia
- R - renal insufficiency (suggested by the U&Es and complicated by the recurrent UTIs - patients are susceptible to infections as the production of antibodies by normal plasma cells is impaired)
- A - this patient is short of breath due to her anaemia (and the FBC shows evidence of pancytopenia - typically due to plasma cells infiltrating the bone marrow)
- B - bone pain (albeit subtle in the form of a vague history of lower back pain)

The immunoglobulin produced by dysplastic plasma cells shows up as a monoclonal band on serum electrophoresis.

Renal ultrasound scan will not aid diagnosis of multiple myeloma.

Cervical lymph node biopsy may be helpful in lymphoma but not myeloma (a bone marrow biopsy would be more helpful in multiple myeloma).

PTH levels can help identify the cause of hypercalcaemia but this patient has enough features suggestive of multiple myeloma to justify investigating for myeloma first.

CT scan of the kidneys, ureters and bladder is unlikely to be helpful in identifying multiple myeloma (although whole-body CT scanning is often used to detect osteolytic lesions).

A 54-year-old man who has developed disseminated intravascular coagulation secondary to sepsis is reviewed. Twenty minutes ago he started to bleed per rectum. Blood products including packed red cells and fresh frozen plasma have been ordered. What is the single most important factor in determining whether cryoprecipitate should be given?

- ☐ A low fibrinogen level
- ☐ A high prothrombin time
- ☐ A high activated partial thromboplastin time
- ☐ A low platelet count
- ☐ A low haemoglobin

A low fibrinogen level

64%

A high prothrombin time

10%

A high activated partial thromboplastin time

16%

A low platelet count

6%

A low haemoglobin

4%

A low fibrinogen level is the major criteria determining the use of cryoprecipitate in bleeding

Important for me Less important

A 4-year-old boy is admitted after developing a haemarthrosis in his right knee whilst playing in the garden. The following blood results are obtained:

Platelets	220 * 10 ⁹ /l
PT	11 secs
APTT	76 secs
Factor VIIIc activity	Normal

What is the most likely diagnosis?

- ☐ Antithrombin III deficiency
- ☐ Von Willebrand's disease
- ☐ Antiphospholipid syndrome
- ☐ Haemophilia A
- ☐ Haemophilia B

Antithrombin III deficiency

6%

Von Willebrand's disease

20%

Antiphospholipid syndrome

3%

Haemophilia A

27%

Haemophilia B

44%

A grossly elevated APTT may be caused by heparin therapy, haemophilia or antiphospholipid syndrome. A normal factor VIIIc activity points to a diagnosis of haemophilia B (lack of factor IX). Antiphospholipid syndrome is a prothrombotic condition

A 17-year-old man is reviewed in the haemato-oncology multi-disciplinary meeting with a diagnosis of Acute lymphoblastic leukaemia, (ALL). The results of bone marrow testing, immunophenotyping, and chromosomal analysis are reviewed.

Which of the following features is associated with a poor prognosis?

- ☐ Hypodiploidy
- ☐ Translocation t(12:21)
- ☐ Precursor B ALL
- ☐ Translocation t(1:19)
- ☐ Trisomy 4

Hypodiploidy	29%
Translocation t(12:21)	21%
Precursor B ALL	28%
Translocation t(1:19)	13%
Trisomy 4	9%

Hypodiploidy is seen as an unfavourable feature in ALL, with the opposite, hyper diploidy associated with a good prognostic outcome.

Trisomy 4, 10 and 17 is associated with a good prognostic outcome in ALL.

The t(12;21) translocation associated with a fusion protein formerly known as TEL-AML1 is associated with a good prognostic outcome in ALL, The t(1;19) translocation is associated with low levels of resistance to chemotherapy intervention in ALL, and thus a good prognostic outcome. The t(9;22) or Philadelphia translocation, is associated with a poor prognosis.

Precursor B-ALL is more responsive to chemotherapy than that involving more mature B lymphocytes.

A patient presents as she has a strong family history of cancer. Which one of the following cancers is least likely to be inherited?

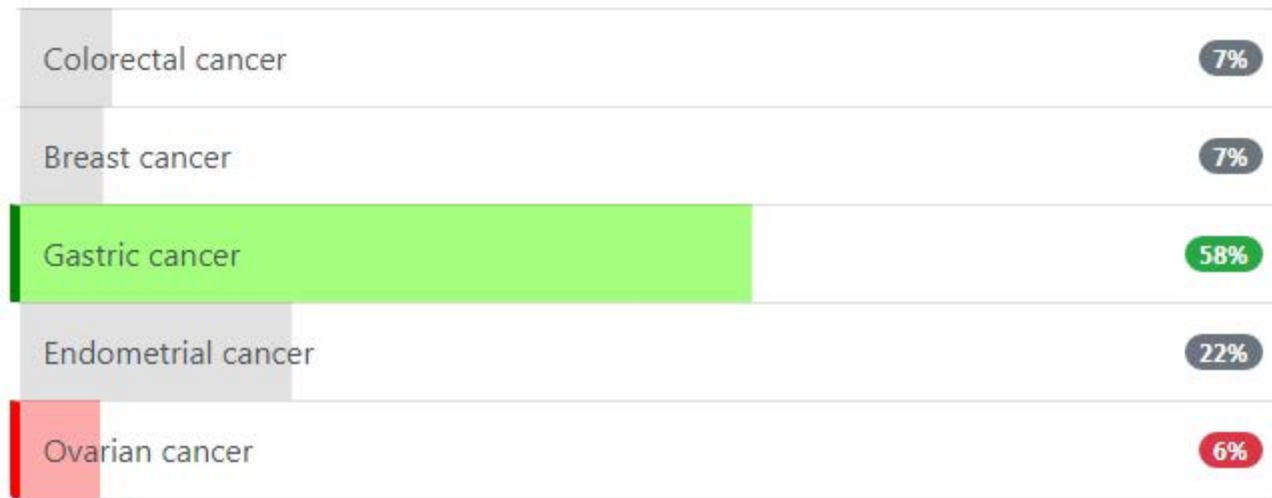
☐ Colorectal cancer

☐ Breast cancer

☐ Gastric cancer

☐ Endometrial cancer

☐ Ovarian cancer



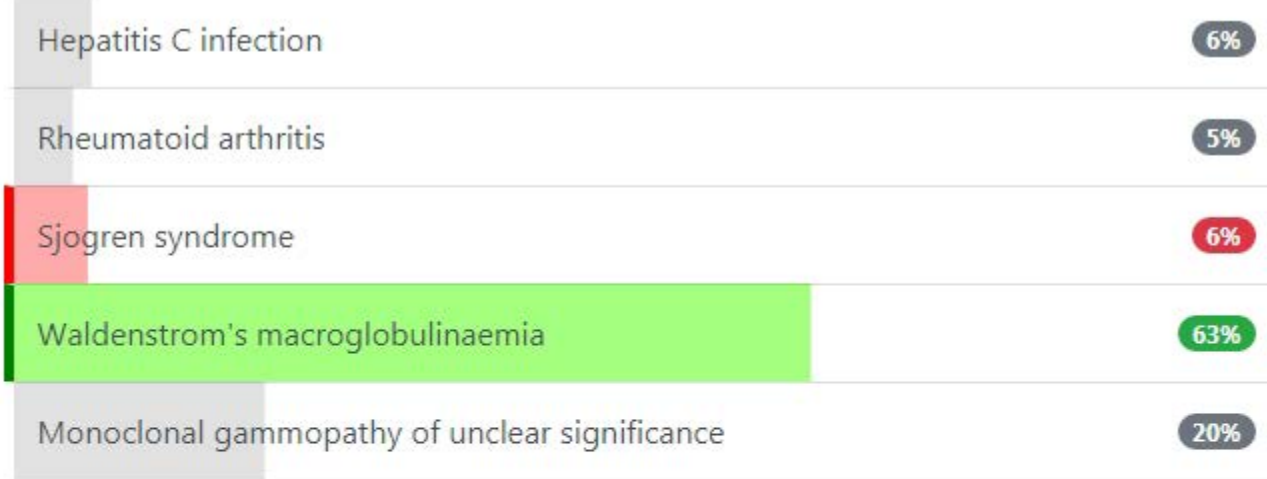
Between 5 and 10% of all breast cancers are thought to be hereditary. Mutation in the BRCA1 and BRCA2 genes also increase the risk of ovarian cancer. For colorectal cancer around 5% of cases are caused by hereditary non-polyposis colorectal carcinoma (HNPCC) and 1% are due to familial adenomatous polyposis. Women who have HNPCC also have a markedly increased risk for developing endometrial cancer - around 5% of endometrial cancers occur in women with this risk factor.

A 59-year-old female patient presents with headache, lethargy, and a purpuric rash on her shins.

Hb	89 g/l
Platelets	$68 \times 10^9/l$
WBC	$2.6 \times 10^9/l$
Protein Electrophoresis	paraprotein 2g/L
Immunoprotein Electrophoresis	monoclonal IgM
C4	low limit of normal
Rheumatoid Factor	elevated

What is the most likely diagnosis?

- ☐ Hepatitis C infection
- ☐ Rheumatoid arthritis
- ☐ Sjogren syndrome
- ☐ Waldenstrom's macroglobulinaemia
- ☐ Monoclonal gammopathy of unclear significance



Waldenstrom macroglobulinaemia is a lymphoplasmacytic lymphoma (lymphoplasmacytic infiltration in the bone marrow or lymphatic tissue) associated with an IgM monoclonal protein in the serum. It is essentially a bone marrow-based disease. Patients may develop constitutional symptoms, pancytopenia (especially anaemia and thrombocytopenia), organomegaly, neuropathy, and symptoms associated with immunoglobulin deposition or hyperviscosity.

Dr. Arsem

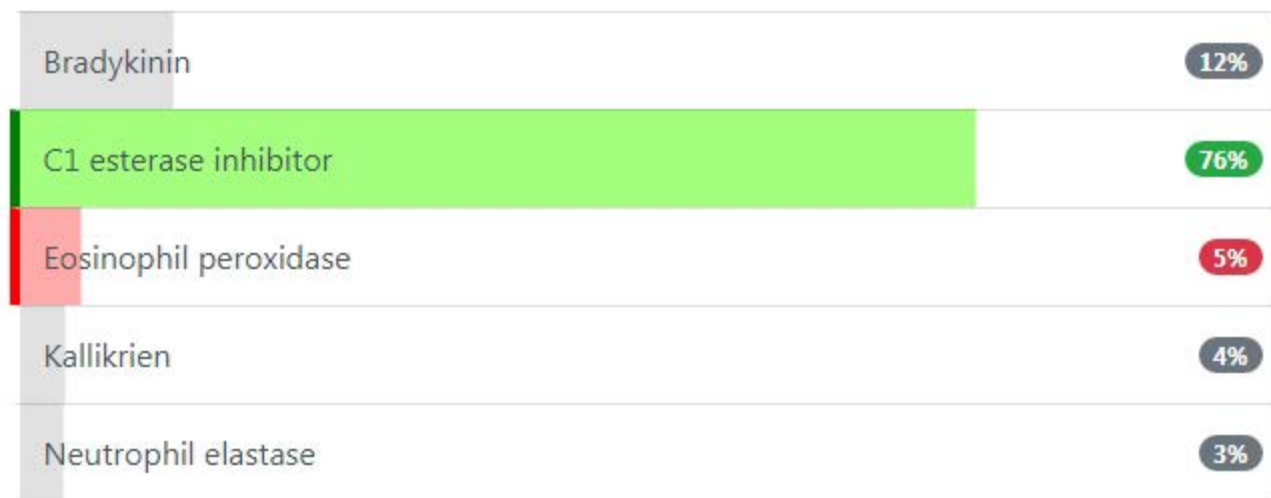
A 22-year-old female presents to the emergency department with angioedema on 5 occasions in a six month period. No obvious trigger was identified and she does not improve significantly when given IM adrenaline.

Her symptoms are caused by a deficiency of which substance?

- ☐ Bradykinin
- ☐ C1 esterase inhibitor
- ☐ Eosinophil peroxidase
- ☐ Kallikrien
- ☐ Neutrophil elastase

A 22-year-old female presents to the emergency department with angioedema on 5 occasions in a six month period. No obvious trigger was identified and she does not improve significantly when given IM adrenaline.

Her symptoms are caused by a deficiency of which substance?



Hereditary angioedema is caused by deficiency of C1 esterase inhibitor

Important for me Less important

Hereditary angioedema is caused by a deficiency of C1 esterase inhibitor.

A 52-year-old woman presents with a painless, enlarged lymph node in her neck. She has no other symptoms. Cytogenetic studies reveal a translocation which confirms a diagnosis of follicular lymphoma.

Which translocation was observed in the patient's cytogenetic studies?

☐ t(9;22)

☐ t(8;14)

☐ t(11;14)

☐ t(14;18)

☐ t(15;17)

t(9;22)

11%

t(8;14)

14%

t(11;14)

19%

t(14;18)

46%

t(15;17)

11%

Follicular lymphoma is characterised by a t(14;18) translocation

Important for me Less important

Follicular lymphoma is driven by a translocation involving Ig heavy chain on chromosome 14 and BCL2 on chromosome 18.

t(9;22) is associated with chronic myeloid leukaemia

t(8;14) is associated with Burkitt lymphoma

t(11;14) is associated with mantle cell lymphoma

t(15;17) is associated with acute promyelocytic leukaemia

Dr Assem

A 67-year-old with chronic kidney disease stage 4 and metastatic prostate cancer presents as his pain is not controlled with co-codamol. Which one of the following opioids is it most appropriate to use given his impaired renal function?

☐ Buprenorphine

☐ Morphine

☐ Hydromorphone

☐ Diamorphine

☐ Tramadol

Dr Assem



Alfentanil, buprenorphine and fentanyl are the preferred opioids in patients with chronic kidney disease.

Which one of the following haematological malignancies is most commonly associated with the t(11;14) translocation?

- ☐ Acute promyelocytic leukaemia
- ☐ Burkitt's lymphoma
- ☐ Acute lymphoblastic leukaemia
- ☐ Mantle cell lymphoma
- ☐ Chronic myeloid leukaemia

Acute promyelocytic leukaemia

10%

Burkitt's lymphoma

18%

Acute lymphoblastic leukaemia

9%

Mantle cell lymphoma

55%

Chronic myeloid leukaemia

8%

A 17-year-old man is investigated for recurrent infections and easy bruising. In the past year he has had four episodes of pneumonia. Other than the bruising he is noted to have severe eczema on his trunk and arms. A full blood count is ordered and reported as follows:

Hb	14.1 g/dl
Plt	$82 \times 10^9/l$
WBC	$5.9 \times 10^9/l$
Neuts	$4.4 \times 10^9/l$

Further bloods show low immunoglobulin M levels. What is the most likely diagnosis?

- ☐ Bruton's congenital agammaglobulinaemia
- ☐ Wiskott-Aldrich syndrome
- ☐ Ataxic telangiectasia
- ☐ Chediak-Higashi syndrome
- ☐ DiGeorge syndrome

Bruton's congenital agammaglobulinaemia

13%

Wiskott-Aldrich syndrome

70%

Ataxic telangiectasia

5%

Chediak-Higashi syndrome

7%

DiGeorge syndrome

5%

Wiskott-Aldrich syndrome

- recurrent bacterial infections (e.g. Chest)
- eczema
- thrombocytopaenia

Important for me

Less important

A 72-year-old man is referred to haematology with a raised haemoglobin. A diagnosis of polycythaemia vera is suspected. Which other abnormality of the blood would be most consistent with this diagnosis?

☐ Raised alkaline phosphatase

☐ Hypokalaemia

☐ Thrombocytopaenia

☐ Raised ferritin level

☐ Neutrophilia

Raised alkaline phosphatase

33%

Hypokalaemia

4%

Thrombocytopaenia

11%

Raised ferritin level

22%

Neutrophilia

29%

Which one of the following causes of primary immunodeficiency is due to a defect in both B-cell and T-cell function?

- ☐ Common variable immunodeficiency
- ☐ Chronic granulomatous disease
- ☐ Wiskott-Aldrich syndrome
- ☐ Chediak-Higashi syndrome
- ☐ Di George syndrome

Common variable immunodeficiency

22%

Chronic granulomatous disease

5%

Wiskott-Aldrich syndrome

56%

Chediak-Higashi syndrome

6%

Di George syndrome

10%

Combined B- and T-cell disorders: SCID WAS ataxic (SCID, Wiskott-Aldrich syndrome, ataxic telangiectasia)

Important for me Less important

Wiskott-Aldrich syndrome causes primary immunodeficiency due to a combined B- and T-cell dysfunction. It is inherited in a X-linked recessive fashion and is thought to be caused by mutation in the WASP gene. Features include recurrent bacterial infections (e.g. chest), eczema and thrombocytopenia

A 54-year-old woman presents to the Emergency Department with a five day history of back pain. Her past medical history includes breast cancer and osteoarthritis. The back pain is located in the lower thoracic region and is made worse by coughing and sneezing. There has been no change in bowel habit or urinary symptoms. On examination there is diffuse tenderness in the lower thoracic region. Peri-anal sensation is normal and lower limb reflexes are brisk. Which one of the following is the most appropriate management plan?

- ☐ Organise outpatient MRI
- ☐ Oral paracetamol + urgent MRI
- ☐ Oral paracetamol + urgent thoracic/lumbar spine x-ray
- ☐ Oral dexamethasone + urgent thoracic/lumbar spine x-ray
- ☐ Oral dexamethasone + urgent MRI

Organise outpatient MRI	6%
Oral paracetamol + urgent MRI	14%
Oral paracetamol + urgent thoracic/lumbar spine x-ray	8%
Oral dexamethasone + urgent thoracic/lumbar spine x-ray	8%
Oral dexamethasone + urgent MRI	64%

This woman has spinal cord compression until proven otherwise and should have urgent assessment.

Recent NICE guidelines suggest contacting the local metastatic spinal cord compression coordinator in this situation. This should hopefully prevent delays in treatment by ensuring the patient is admitted to the most appropriate place

A 31-year-old woman who is 25-weeks pregnant is brought to the Emergency Department by her husband. Over the past two days she has become increasingly confused. Her temperature is 37.8°C and blood pressure is 104/62 mmHg. Blood tests show:

Hb	8.3 g/dl
Platelets	$88 \times 10^9/l$
WBC	$15.1 \times 10^9/l$
Blood film	Fragmented red blood cells
Sodium	139 mmol/l
Potassium	5.2 mmol/l
Urea	19.4 mmol/l
Creatinine	296 μ mol/l

What is the most appropriate treatment?

- ☐ Rituximab
- ☐ Intravenous immunoglobulin
- ☐ Methylprednisolone
- ☐ Ceftriaxone + vancomycin
- ☐ Plasma exchange

Rituximab

4%

Intravenous immunoglobulin

12%

Methylprednisolone

15%

Ceftriaxone + vancomycin

4%

Plasma exchange

64%

TTP - plasma exchange is first-line

Important for me Less important

This patient has thrombotic thrombocytopenic purpura, a condition associated with pregnancy

Which one of the following would most suggest a leukaemoid reaction rather than chronic myeloid leukaemia?

- ☐ Raised packed cell volume
- ☐ Right shift of neutrophils
- ☐ A low leucocyte alkaline phosphatase score
- ☐ Dohle bodies in the white cells
- ☐ Positive osmotic fragility test

Raised packed cell volume

7%

Right shift of neutrophils

24%

A low leucocyte alkaline phosphatase score

26%

Dohle bodies in the white cells

38%

Positive osmotic fragility test

5%

A 77-year-old lady is admitted by the emergency department complaining of difficulty coping at home. She is unable to mobilise independently and has a poor appetite due to difficulty swallowing. She has a diagnosis of oesophageal cancer but is not thought to be a candidate for chemotherapy. Her GP recently started her on nitrofurantoin for a urinary tract infection.

On examination she is a thin, frail lady who is alert and oriented. There is no neurological deficit in the upper limbs. She has weakness of hip flexion and knee extension in both legs, but markedly more so on the right. You are able to elicit some loss of pinprick sensation on the anterior thigh. Her reflexes are brisk with an upgoing plantar on the right.

Her blood results are as follows:

Hb	101 g/l
Platelets	440 * 10 ⁹ /l
WBC	8.4 * 10 ⁹ /l
MCV	99 fL
Na ⁺	136 mmol/l
K ⁺	4.8 mmol/l
Urea	3.7 mmol/l
Creatinine	52 µmol/l

What is the next most appropriate step in this patient's management?

- ☐ Transfer to hospice
- ☐ Refer for physiotherapy
- ☐ MRI imaging of the spinal cord
- ☐ Check B12 and folate levels
- ☐ Stop nitrofurantoin



A patient with new lower limb neurology and a history of cancer should raise the suspicion of metastatic spinal cord compression, which is best demonstrated on MRI.

Although nitrofurantoin and B12 deficiency could cause a peripheral neuropathy, both are less urgent problems than cord compression.

A 67-year-old man presents feeling 'generally unwell' and complaining of pain in his back and legs. His wife also reports that he has been slightly confused for the past two weeks. Basic blood tests are ordered:

Hb	12.1 g/dl
Platelets	411 * 10 ⁹ /l
WBC	7.6 * 10 ⁹ /l

Na ⁺	143 mmol/l
K ⁺	5.3 mmol/l
Urea	15.7 mmol/l
Creatinine	208 µmol/l

Bilirubin	20 µmol/l
ALP	110 u/l
ALT	55 u/l
γGT	67 u/l
Albumin	31 g/l
Total protein	84 g/l

Calcium	3.10 mmol/l
Phosphate	0.79 mmol/l

What is the most likely underlying diagnosis?

- ☒ Multiple myeloma
- ☐ Renal cancer with bony metastases
- ☐ Sarcoidosis
- ☐ Primary hyperparathyroidism
- ☐ Prostate cancer with bony metastases

Multiple myeloma

72%

Renal cancer with bony metastases

6%

Sarcoidosis

4%

Primary hyperparathyroidism

8%

Prostate cancer with bony metastases

9%

Hypercalcaemia, renal failure, high total protein = myeloma

Important for me Less important

One of the stand out results is the high calcium level. This immediately narrows the differential diagnosis considerably. Remember the two most common causes of hypercalcaemia are malignancy and primary hyperparathyroidism. Neither of these alone would however explain the renal failure and high total protein, both common features of untreated myeloma.

A 38-year-old Pakistani female was admitted with shortness of breath and a syncopal episode. She describes a 2 week history of lethargy, malaise and dizziness. The patient had recently started anti-tuberculous therapy. History revealed she was not a vegetarian.

Hb	8.5g/dl
MCV	72fl
WCC	$11 \times 10^9/l$
Platelets	$225 \times 10^9/l$
TSAT	33%
Ferritin	600ng/ml
Haemoglobin electrophoresis	normal

Which stain should be applied to a blood film?

- ☐ Giemsa
- ☐ Gram
- ☐ Ziehl Neelsen
- ☐ Perl's
- ☐ India ink



This 38 year old Pakistani female has presented with symptomatic anaemia. Blood tests reveal a microcytic anaemia, the causes of which can be broadly categorised into: 1, iron deficiency, 2, thalassaemia trait 3, sideroblastic anaemia.

Interpreting the iron studies shows a normal transferrin saturation and normal ferritin, ruling out iron deficiency anaemia. Normal haemoglobin electrophoresis rules out thalassaemia, therefore the likely cause is sideroblastic anaemia. This is also hinted at by the recent commencement of Isoniazid (anti tuberculous therapy) a cause of sideroblastic anaemia.

Sideroblastic anaemia when stained with Perl's stain shows ring sideroblasts. The disease is characterised by ineffective erythropoiesis leading to poor incorporation of iron into the nucleus of erythroblasts.

A 34-year-old man who is known to have glucose-6-phosphate dehydrogenase deficiency presents with symptoms of a urinary tract infection. He is prescribed an antibiotic. A few days later he becomes unwell and is noticed by his partner to be pale and jaundiced. What drug is mostly likely to have been prescribed?

☐ Co-amoxiclav

☐ Trimethoprim

☐ Ciprofloxacin

☐ Cefalexin

☐ Erythromycin

Co-amoxiclav

6%

Trimethoprim

31%

Ciprofloxacin

53%

Cefalexin

4%

Erythromycin

7%

The sulfamethoxazole in co-trimoxazole causes haemolysis in G6PD, not the trimethoprim

Important for me Less important

A 72-year-old man with longstanding Waldenström's macroglobulinemia presents to rheumatology clinic with joint pains and generalised weakness.

Which of the following would be most indicative of Type I cryoglobulinaemia?

- ☐ Livedo reticularis
- ☐ Raynaud's phenomenon
- ☐ Arthralgia
- ☐ Membranoproliferative glomerulonephritis
- ☐ Low C4 levels

Livedo reticularis	11%
Raynaud's phenomenon	48%
Arthralgia	5%
Membranoproliferative glomerulonephritis	15%
Low C4 levels	21%

Raynaud's - Type I cryoglobulinaemia

Important for me Less important

Cryoglobulinaemia can be caused by paraprotein bands such as those in Waldenström's macroglobulinemia and multiple myeloma. Meltzer's triad of arthralgia, weakness and palpable purpura are common to all types of cryoglobulinaemia - as are membranoproliferative glomerulonephritis and low C4 levels.

Raynaud's occurs most commonly in type 1 cryoglobulinaemia and its presence can be helpful in ascertaining the underlying cause.

A 60-year-old woman is investigated for painful fingers and toes in cold weather. She has previously been diagnosed with Raynaud's phenomenon but she is now experiencing significant purplish discolouration of her peripheries and nose as well as generally feeling tired and lethargic. Blood tests shows the following:

Hb	99 g/l
Platelets	$156 \times 10^9/l$
WBC	$5.9 \times 10^9/l$
Blood film	Spherocytes seen

What is the next best investigation?

- ☐ Complement levels
- ☐ Osmotic fragility test
- ☐ Anti-nuclear antibody
- ☐ Flow cytometry of blood
- ☐ Direct antiglobulin test

Complement levels

12%

Osmotic fragility test

30%

Anti-nuclear antibody

9%

Flow cytometry of blood

14%

Direct antiglobulin test

35%

This lady is likely to have cold agglutinin disease, a form of autoimmune hemolytic anemia.

A 48 year old nurse presents with a short history of epistaxis and bleeding gums. You request urgent bloods, the results of which are shown in the table below:

Haemoglobin	86 g/L
White cells	$2.3 \times 10^9/\text{L}$
Platelets	$18 \times 10^9/\text{L}$
Clotting	deranged
Blood film	bilobed large mononuclear cells

What is the most likely diagnosis?

- ☐ Von Willebrand's disease
- ☐ Acute lymphoblastic leukaemia
- ☐ Lymphoma
- ☐ Acute myeloid leukaemia
- ☐ Surreptitious warfarin overdose

Von Willebrand's disease	18%
Acute lymphoblastic leukaemia	15%
Lymphoma	15%
Acute myeloid leukaemia	45%
Surreptitious warfarin overdose	7%

This is a picture of bone marrow failure secondary to acute myeloid leukaemia.

In acute leukaemia a malignant expansion abnormal white cells accumulate in the bone marrow, replacing normal haemopoietic cells.

Acute expansion of the myeloid stem line (acute myeloid leukaemia) is more common over the age of 45, in comparison with acute lymphoblastic leukaemia which is mostly seen in children.

Lymphoma does not tend to present in this way, but more so with rubbery enlargement of lymph nodes.

Von Willebrand's disease may present with epistaxis and bleeding gums in severe cases, but it is rare that there are abnormalities on blood results.

A 38-year-old female patient presents to the emergency department with severe abdominal pain, nausea and vomiting. She also reports reduced sensation in the bilateral lower limb extremities. She appears highly agitated and labile in mood. Her partner reports that this has happened about 6 times before and various suspected diagnoses were made for these past episodes but no definite diagnosis was ever made. She reports that her mother also gets such episodes. These past suspected diagnoses include acute appendicitis, renal calculi, acute intestinal obstruction. They were all found to be negative.

What is the likely diagnosis to account for this clinical presentation?

☐ Acute intermittent porphyria

☐ Porphyria cutanea tarda

☐ Lead poisoning

☐ Neurotic disorder

☐ Multiple sclerosis

Acute intermittent porphyria	70%
Porphyria cutanea tarda	7%
Lead poisoning	15%
Neurotic disorder	4%
Multiple sclerosis	4%

Acute intermittent porphyria typically presents with abdominal, neurological and psychiatric symptoms

Important for me Less important

Acute intermittent porphyria (AIP) typically presents with abdominal, neurological and psychiatric symptoms.

Porphyria cutanea tarda presents with photosensitive bullae.

Lead poisoning is possible to account for this presentation but it doesn't account for the family history. AIP is more likely given the family history.

Neurotic disorder may be possible but physical causes need to be ruled out before considering a psychiatric diagnosis.

Multiple sclerosis doesn't usually present with gastrointestinal symptoms.

A 34-year-old man who is known to have type 1 von Willebrand's disease asks for advice. He is due to have a tooth extracted at the dentist next week. Which one of the following is the most appropriate management to reduce the risk of bleeding?

- ☐ Mefenamic acid
- ☐ Vitamin K
- ☐ Desmopressin
- ☐ Factor VIII concentrate
- ☐ Factor VII concentrate

Mefenamic acid

12%

Vitamin K

7%

Desmopressin

49%

Factor VIII concentrate

26%

Factor VII concentrate

6%

Blood products such as factor VIII concentrate should be avoided when possible to minimise the risk of transfusion acquired viral illnesses.

An 80-year-old man is reviewed in the haematology clinic. He has been referred due to weight loss, lethargy and a significantly elevated IgM level. Recent bloods show the following:

Hb	13.8 g/dl
Platelets	127 * 10 ⁹ /l
IgM	2150 mg/dl (range 50-330 mg/dl)
ESR	45 mm/hr

Given the likely diagnosis, which one of the following complications is he most likely to develop?

- ☐ Renal failure
- ☐ Chronic lymphocytic leukaemia
- ☐ Anaemia
- ☐ Hyperviscosity syndrome
- ☐ Hypercalcemia

Renal failure

15%

Chronic lymphocytic leukaemia

11%

Anaemia

6%

Hyperviscosity syndrome

54%

Hypercalcemia

14%

IgM paraproteinaemia - ?Waldenstrom's macroglobulinaemia

Important for me

Less important

This patient has Waldenstrom's macroglobulinaemia. Hyperviscosity syndrome is present in around 10-15% of patients. Other common complications include hepatosplenomegaly.

A 38-year-old woman presents with a 2-month history of symptoms of fatigue, pallor and palpitations. She also complains of breathlessness at rest as well as during exertion. She has an established diagnosis of systemic lupus erythematosus (SLE). On abdominal examination you notice the spleen is slightly enlarged. Blood tests reveal:

Hb	90 g/l (115-160 g/l)
MCV	90 fl (82-100 fl)
D-dimer	150 ng/ml (<400 ng/ml)
Direct Coombs test	Pos

What is the most likely diagnosis?

- ☐ IgM-mediated autoimmune haemolytic anaemia
- ☐ IgG-mediated autoimmune haemolytic anaemia
- ☐ Paroxysmal nocturnal haemoglobinuria
- ☐ Immune thrombocytopenic purpura
- ☐ G6PD deficiency

IgM-mediated autoimmune haemolytic anaemia

24%

IgG-mediated autoimmune haemolytic anaemia

60%

Paroxysmal nocturnal haemoglobinuria

6%

Immune thrombocytopenic purpura

6%

G6PD deficiency

4%

SLE is a risk factor for warm autoimmune haemolytic anaemia

Important for me [Less important](#)

SLE is an important risk factor for IgG-mediated, warm autoimmune haemolytic anaemia. This is associated with extravascular haemolysis which can lead to a hypertrophic spleen.

IgM-mediated autoimmune haemolytic anaemia is not specifically linked to SLE and would also present with cold-induced symptoms involving the hands and toes.

Paroxysmal nocturnal haemoglobinuria is a deficiency of GPI protein on red blood cells leaving them susceptible to complement-mediated destruction.

Immune thrombocytopenic purpura is an autoimmune condition characterised by thrombocytopenia.

G6PD deficiency is an enzymatic deficiency within red blood cells rendering them prone to oxidative stress.

A 30-year-old female presents to the Emergency Department with epistaxis, which has now terminated. Her boyfriend reports she has a recent history of mucosal bleeding and has at times been very disorientated. On examination, she has a low-grade fever and appears confused and jaundiced. There is bruising over her legs and arms. A urine pregnancy test is negative. You receive the following blood results from the laboratory:

Hb	85 g/l
Platelets	$8 \times 10^9/l$
WBC	$4.5 \times 10^9/l$
MCV	92 fl
Na ⁺	138 mmol/l
K ⁺	4.9 mmol/l
Urea	10.2 mmol/l
Creatinine	182 μ mol/l

Clotting studies are normal. Given the most likely diagnosis, what is the most appropriate management of this patient?

- ☐ Platelet transfusion
- ☐ Intravenous immunoglobulin
- ☐ Plasma exchange
- ☐ Intravenous methylprednisolone
- ☐ Intravenous argatroban

Platelet transfusion	10%
Intravenous immunoglobulin	11%
Plasma exchange	64%
Intravenous methylprednisolone	13%
Intravenous argatroban	3%

This question requires you to identify correctly the haematological emergency and be aware of the correct management.

Thrombotic thrombocytopenic purpura (TTP) is classically characterised as a pentad of: thrombocytopenia, microvascular haemolysis, fluctuating neurological signs, renal impairment and fever.

Also in the differential diagnosis for severe thrombocytopenia is immune thrombocytopenic purpura (ITP). ITP is more common than TTP however would not present with the range of symptoms seen in this scenario.

TTP has an untreated mortality of up to 90% and therefore rapid plasma exchange (PEX) may be a life saving intervention. Platelet transfusion in TTP is only indicated if there is an on-going life-threatening bleed. Intravenous methylprednisolone is indicated after treatment with PEX has been completed.

There is no current role for intravenous immunoglobulin in the routine management of TTP, however there have been reports of its successful use in PEX- and steroid-refractory cases.

Intravenous argatroban is indicated in heparin-induced thrombocytopenia (HIT), however there is no history of recent heparin administration or hospitalisation in this patient, nor are the clinical signs consistent with HIT.

A 78-year-old male is admitted to the ward with suspected sepsis. He is receiving IV antibiotics. The nurse informs you the patient is deteriorating with tachycardia, hypotension and bleeding from the IV site. You suspect the patient has disseminated intravascular coagulation (DIC) secondary to sepsis.

If a blood film was taken from the patient, which of the following would most likely be observed on histology?

- ☐ Schistocytes
- ☐ Bite cells
- ☐ Howell-Jolly bodies
- ☐ Heinz bodies
- ☐ Target cells

Schistocytes	62%
Bite cells	12%
Howell-Jolly bodies	9%
Heinz bodies	8%
Target cells	8%

DIC is associated with schistocytes due to microangiopathic haemolytic anaemia

Important for me Less important

DIC can trigger microangiopathic haemolytic anaemia. Red blood cells are sheared by microthrombi as they pass through the circulation producing schistocytes which can be visualised on histology.

Heinz bodies and bite cells are characteristic of glucose-6-phosphate dehydrogenase (G6PD) deficiency.

Howell-Jolly bodies are seen in asplenic patients.

Target cells can be seen in conditions such as thalassaemia.

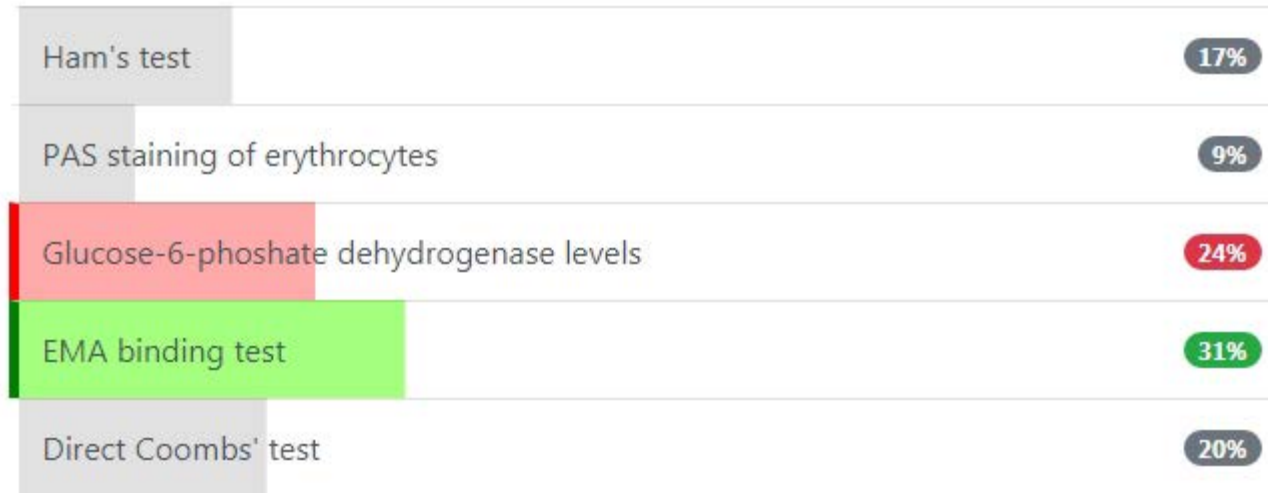
A 21-year-old man comes for review. He recently had an abdominal ultrasound for episodic right upper quadrant pain which demonstrated gallstones. A full blood count was also ordered which was reported as follows:

Hb	9.8 g/dl
MCV	91 fl
Plt	$177 \times 10^9/l$
WBC	$5.3 \times 10^9/l$

The patient also mentions that his father had a splenectomy at the age of 30 years.

Which one of the following tests is most likely to be diagnostic?

- ☐ Ham's test
- ☐ PAS staining of erythrocytes
- ☐ Glucose-6-phosphate dehydrogenase levels
- ☐ EMA binding test
- ☐ Direct Coombs' test



This patient likely has hereditary spherocytosis (HS) as evidenced by the normocytic anaemia, gallstones and family history. The British Journal of Haematology guidelines state that a clinical diagnosis of HS can sometimes be made for classical histories. However, if the case is more equivocal then a diagnostic test is recommended, such as the EMA binding test.

The EMA binding test uses flow cytometry to determine the amount of fluorescence (reflecting EMA bound to specific transmembrane proteins) derived from individual red cells.

Which of the following may be used in the treatment of hereditary angioedema?

- ☐ Anabolic steroids
- ☐ Oral contraceptive pill
- ☐ ACE inhibitors
- ☐ Beta-blockers
- ☐ Aspirin

Anabolic steroids

57%

Oral contraceptive pill

3%

ACE inhibitors

19%

Beta-blockers

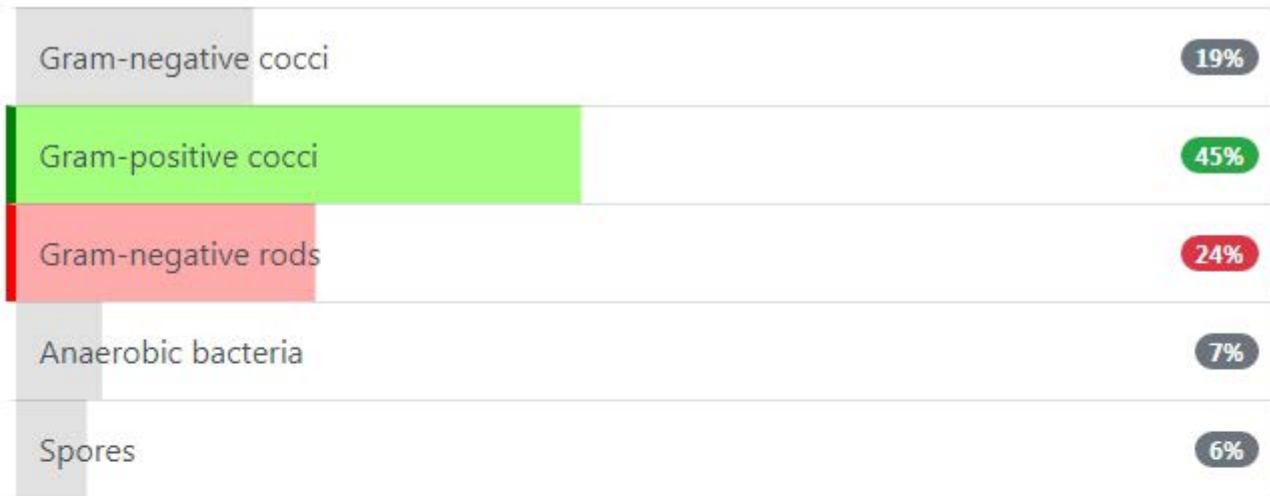
9%

Aspirin

12%

A 62-year-old woman presents after being advised by the chemotherapy helpline to come to a hospital. She has a past medical history of neuroendocrine cancer of the cervix treated with carboplatin and etoposide. Her last treatment was eight days ago. She has been feeling generally unwell with temperatures measured at home at 38.1C. Blood cultures are taken and she is started on neutropenic sepsis protocol. What is gram-staining of the blood cultures most likely to show?

- ☐ Gram-negative cocci
- ☐ Gram-positive cocci
- ☐ Gram-negative rods
- ☐ Anaerobic bacteria
- ☐ Spores



The correct answer is gram-positive cocci. Gram-negative bacilli used to be the most common pathogen isolated in neutropenic sepsis, but over time the most common pathogens are now gram-positive organisms. These accounts for a majority of the identified organisms, and are most commonly endogenous organisms. The most frequent cause is *Staphylococcus epidermidis*, and following this are other staphylococci and streptococci species.

Source:

'Febrile Neutropenia.' BMJ Best Practice. 15 Sept. 2016.

Dr Assem

Interferon alpha is a recognised treatment for which one of the following haematological disorders?

- ☐ Acute lymphoblastic leukaemia
- ☐ Myelofibrosis
- ☐ Burkitt's lymphoma
- ☐ Hairy cell leukaemia
- ☐ Acute myeloid leukaemia

Acute lymphoblastic leukaemia

10%

Myelofibrosis

21%

Burkitt's lymphoma

15%

Hairy cell leukaemia

40%

Acute myeloid leukaemia

15%

Interferons (IFN) are cytokines released by the body in response to viral infections and neoplasia. They are classified according to cellular origin and the type of receptor they bind to. IFN-alpha and IFN-beta bind to type 1 receptors whilst IFN-gamma binds only to type 2 receptors.

IFN-alpha is produced by leucocytes and has an antiviral action. It has been shown to be useful in the management of hepatitis B & C, Kaposi's sarcoma, metastatic renal cell cancer and hairy cell leukaemia

Dr Assem

You are working on a geriatric post when you notice that a 93-year-old man on your ward has had consistently high white blood cells, despite several courses of antibiotics. His bloods today show:

Hb	91 g/l
Platelets	$250 \times 10^9/l$
WBC	$32.2 \times 10^9/l$
Neutrophils	$28.1 \times 10^9/l$

Despite this he has at no point shown signs of any infection. Your consultant suggests contacting haematology with regards to ascertaining the leucocyte alkaline phosphatase score.

Which of the following conditions would have a high leucocyte alkaline phosphatase score?

- ☐ Chronic myeloid leukaemia (CML)
- ☐ Acute myeloid leukaemia (AML)
- ☐ Paroxysmal nocturnal haemoglobinuria (PNH)
- ☐ Leukemoid reaction
- ☐ Pregnancy

Chronic myeloid leukaemia (CML)	22%
Acute myeloid leukaemia (AML)	9%
Paroxysmal nocturnal haemoglobinuria (PNH)	5%
Leukemoid reaction	60%
Pregnancy	4%

Leukemoid reaction has a high leucocyte alkaline phosphatase score

Important for me Less important

The answer is leukemoid reaction. Leucocyte ALP is one of types of alkaline phosphatase. It has a diagnostic value in differentiating causes of high number of white blood cells, seen on manual differentials.

The leukemoid reaction refers to the 'left-shift' of immature white blood cells that occurs in underlying infections. On a blood film, this could mistakenly be thought to be a malignant process (like CML). Leucocyte ALP can differentiate the two - a low score indicates undeveloped leukocytes, like those found in CML and AML. PNH also causes a low score.

Placental ALP found in pregnancy is a distractor.

A 27-year-old woman presents to the Emergency Department with a sudden onset of swelling of the hands and face. She describes multiple similar episodes over the past few years, but this episode is the most severe. She cannot recall any obvious precipitant. On previous occasions, the symptoms have subsided within thirty minutes but on this occasion they have worsened over the course of an hour. On examination, there is significant swelling of the lips which are dry and shiny. The tongue is not enlarged. There is no stridor and the chest is clear. Respiratory rate is 22 and oxygen saturations are 96% on air. The hands are swollen and slightly erythematous but there is no pain or itching and no lymphadenopathy. Heart rate is 106bpm and blood pressure is 118/79mmHg. Tympanic temperature is 36.7°C. A diagnosis of hereditary angioedema is suspected.

Which one of the following is not implicated in the pathogenesis of hereditary angioedema?

- ☐ C1-esterase inhibitor
- ☐ Bradykinin
- ☐ Histamine
- ☐ Kallikrein
- ☐ High molecular weight kininogen

C1-esterase inhibitor

15%

Bradykinin

9%

Histamine

44%

Kallikrein

12%

High molecular weight kininogen

20%

Hereditary angioedema (HAE) is pathophysiologically separate from anaphylaxis and is treated differently. Therapeutic options are: intravenous infusion of human C1-esterase inhibitor or subcutaneous injection of the bradykinin receptor inhibitor icatibant

Important for me Less important

Hereditary angioedema (HAE) is an autosomal dominantly inherited immune condition characterised by episodic swelling of the extremities, intra-abdominal viscera and mucous membranes. Often attacks are unprecipitated although sometimes exogenous oestrogens in the form of contraception can be traced, as well as exposure to angiotensin-converting enzyme inhibitors. The primary pathophysiological defect is in the complement cascade and deficiencies in factors C4 and C1-esterase inhibitor are seen in type I. In type II HAE C1-esterase inhibitor levels are normal but the enzyme is dysfunctional and activity is low. An acquired form of HAE is described in which all complement levels are low. In type III HAE the clinical features of angioedema are present but immunological testing reveals normal levels and activity of complement factors. Ultimately, failure of C1-esterase inhibitor leads to upregulation of the rest of the complement system and membrane attack complex, but also it leads to activation of the signalling protein kallikrein which acts directly on the vascular wall to increase permeability, and it cleaves high molecular weight kininogen to release bradykinin, again a potent peripheral vasodilator giving rise to the symptoms of HAE.

HAE should be recognised as a separate entity from anaphylaxis since the clinical signs are different, as is the pathophysiology of the condition and its treatment. Anaphylaxis is an IgE mediated immune phenomenon related to a specific allergen causing massive mast cell degranulation and histamine release. HAE is driven by complement dysregulation and consequent release of the inflammatory cytokines bradykinin and kallikrein. Anaphylaxis is characterised by rapidly progressive, itchy, erythematous, oedematous rash, swelling of the lips, tongue and airways with accompanying hypovolaemic hypotension and cardiovascular collapse due to increased tissue permeability. Anaphylaxis is a medical emergency and death can ensue in minutes unless treated properly. HAE in comparison may present recurrently and often with no obvious precipitant. Usually, its course is more insidious with the evolution of symptoms over minutes to hours. Swelling will often only affect an isolated limb and it is not itchy or painful and minimally erythematous. Hypotension is rarely seen and cardiovascular instability is extremely unlikely. HAE can be fatal however if swelling of the upper airways causes obstruction, and in some cases, prophylactic intubation and mechanical ventilation may be appropriate. Since the driving mechanism is not histamine in HAE, steroids and antihistamines are of no value. Where there is no haemodynamic compromise, adrenaline is not warranted and may even worsen the situation due to increased plasma glucose load and risk of capillary rupture.

Knowledge of the cytokine cascade in HAE allows for knowledge of its management. Since the initiating pathophysiological hallmark is a deficiency or reduced effectiveness of C1-esterase inhibitor, exogenous administration of synthetic or reconstituted inhibitor should be effective.

National guidelines released in 2013 recommend treatment of episodes of HAE with the administration of reconstituted human C1-esterase inhibitor. In the UK two brands are available; either Cinryze which is dosed at 1000 unit administration or Berinert at 20 units/kg. Both are administered as slow intravenous infusions. Interestingly, a good clinical response is often seen to these drugs even in HAE type III where C1-esterase levels are normal.

An alternative to exogenous C1-esterase inhibitor is icatibant which is a specific antagonist at B2 bradykinin receptors in vascular smooth muscle. The 30mg dose may be repeated up to three times in 24 hours but a rapid resolution of symptoms is often seen. Many patients with HAE are supplied with their own icatibant autoinjectors for use in the pre-hospital setting at the onset of symptoms.

Ecallantide is a selective inactivator of the cytokine kallikrein. It is highly effective in the treatment of HAE in the United States but has no European licence at this current time.



Discuss (2)

Improve

Which one of the following is least likely to precipitate haemolysis in a patient with G6PD deficiency?

☐ Broad beans

☐ Sepsis

☐ Ciprofloxacin

☐ Primaquine

☐ Penicillin



A 69-year-old male patient presents to the oncology clinic with a 3-months history of right upper quadrant discomfort, weight loss and anorexia. Ultrasound liver raises the suspicion of a hepatocellular carcinoma.

Which carcinogen had he likely been exposed to?

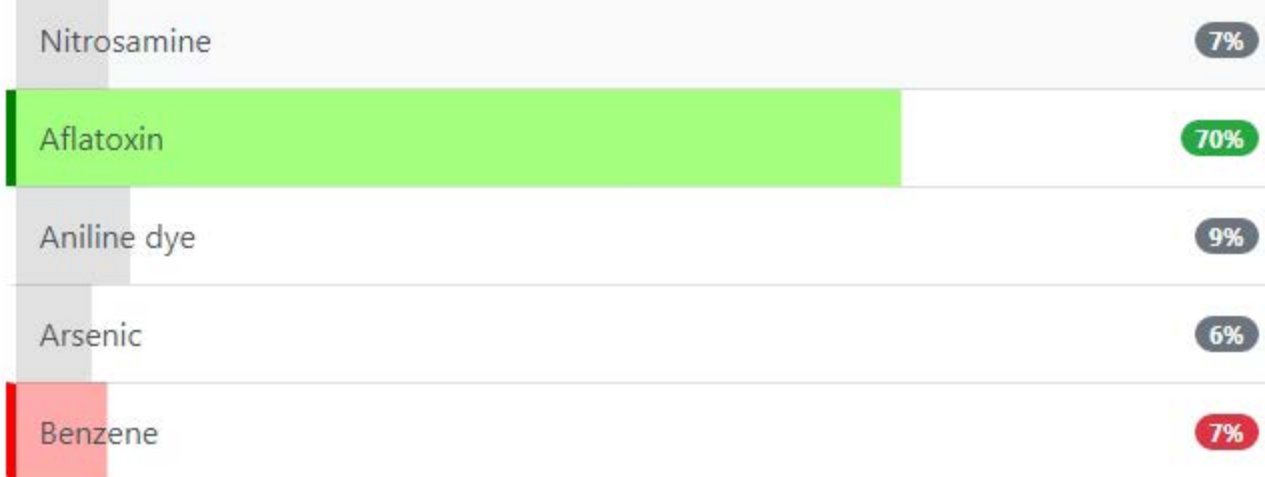
☐ Nitrosamine

☐ Aflatoxin

☐ Aniline dye

☐ Arsenic

☐ Benzene



Exposure to aflatoxin is a risk factor for hepatocellular carcinoma

Important for me Less important

Exposure to aflatoxin is a risk factor for hepatocellular carcinoma.

Exposure to nitrosamine is a risk factor for gastric and oesophageal carcinoma.

Exposure to aniline dye is a risk factor for transitional cell carcinoma.

Exposure to arsenic is a risk factor for lung malignancy and liver angiosarcoma.

Exposure to benzene is a risk factor for leukaemia.

A 31-year-old man is referred to the acute medical unit with a painful swollen left leg. The patient reports that he has the 'Factor V Leiden mutation'. Which one of the following best describes the pathophysiology of his condition?

- ☐ Protein S deficiency
- ☐ Activated protein C excess
- ☐ Antithrombin deficiency
- ☐ Resistance to action of protein C
- ☐ Activated protein C deficiency

Protein S deficiency

5%

Activated protein C excess

4%

Antithrombin deficiency

9%

Resistance to action of protein C

57%

Activated protein C deficiency

24%

Factor V Leiden mutation results in activated protein C resistance

Important for me Less important

A 73-year-old woman is reviewed in the pre-op clinic prior to an elective hip replacement. Her past medical history includes polymyalgia rheumatica and ischaemic heart disease. Screening blood tests are ordered and the full blood count is reported as follows:

Hb	12.9 g/dl
Plt	$158 \times 10^9/l$
WBC	$19.0 \times 10^9/l$
Neuts	$4.2 \times 10^9/l$
Lymphs	$14.1 \times 10^9/l$

What is the most likely diagnosis?

- ☐ Lymphoma
- ☐ Nicorandil-related lymphocytosis
- ☐ Transient viral illness
- ☐ Chronic lymphocytic leukaemia
- ☐ Secondary to steroid use

Lymphoma

5%

Nicorandil-related lymphocytosis

12%

Transient viral illness

9%

Chronic lymphocytic leukaemia

50%

Secondary to steroid use

24%

Such a lymphocytosis in an elderly patient is very likely to be caused by chronic lymphocytic leukaemia. Steroids tend to cause a neutrophilia. It would be unusual for a viral illness to cause such a marked lymphocytosis in an elderly person.

A 71-year-old woman who is known to have multiple myeloma is admitted with confusion. Blood tests show the following:

Corrected calcium	2.91 mmol/l
-------------------	-------------

Which one of the following is the most significant cause of the raised calcium level?

- ☐ Adverse effects of standard treatment
- ☐ Increased osteoclastic activation
- ☐ Impaired renal function
- ☐ Increased renal tubular calcium reabsorption
- ☐ Elevated PTH-rP levels

Adverse effects of standard treatment

4%

Increased osteoclastic activation

66%

Impaired renal function

9%

Increased renal tubular calcium reabsorption

7%

Elevated PTH-rP levels

14%

Dr. Arsem

A 65-year-old female with metastatic breast cancer is reviewed in clinic. Her husband reports that she is increasingly confused and occasionally appears to talk to relatives that are not in the room. She undergoes investigations for reversible causes, of which none are found. If conservative measures fail and she continues to be confused/agitated, what is the most appropriate management?

☐ Subcutaneous midazolam

☐ Oral lithium

☐ Oral haloperidol

☐ Oral diazepam

☐ Oral quetiapine

Subcutaneous midazolam

26%

Oral lithium

3%

Oral haloperidol

57%

Oral diazepam

6%

Oral quetiapine

8%

Oral haloperidol is the most appropriate treatment here. If the patient was in the terminal phase and agitated then subcutaneous midazolam would be indicated

A 34-year-old man is reviewed four years after having an orchidectomy for a testicular teratoma. What are the most useful follow-up investigation(s) to detect disease recurrence?

- ☐ CRP + beta-HCG
- ☐ Testosterone + beta-HCG
- ☐ ESR + alpha-fetoprotein
- ☐ Alpha-fetoprotein + beta-HCG
- ☐ LDH + ESR

CRP + beta-HCG

3%

Testosterone + beta-HCG

23%

ESR + alpha-fetoprotein

6%

Alpha-fetoprotein + beta-HCG

66%

LDH + ESR

3%

A 65-year-old woman is reviewed. She is on the waiting list for a varicose vein operation but during the preoperative assessment was noted to have a raised lymphocyte count. She reports feeling well currently and clinical examination is normal. Her bloods were as follows:

Hb	11.8 g/dl
Plt	$184 \times 10^9/l$
WBC	$21.2 \times 10^9/l$

There are no previous bloods to compare these results with. Following referral to haematology a diagnosis of chronic lymphocytic leukaemia was made. What is the most appropriate management?

- ☐ No treatment + cancel operation
- ☐ No treatment + go ahead with operation
- ☐ Chlorambucil + cancel operation
- ☐ Fludarabine + go ahead with operation but with quinolone prophylaxis
- ☐ Alemtuzumab + cancel operation

Dr Assem

No treatment + cancel operation

8%

No treatment + go ahead with operation

61%

Chlorambucil + cancel operation

9%

Fludarabine + go ahead with operation but with quinolone prophylaxis

16%

Alemtuzumab + cancel operation

6%

There is no indication for treating this patient at the current time or not going ahead with surgery

A 40-year-old male patient is admitted with recurrent pancreatitis. A CT scan reveals no pancreatic mass, but evidence of widespread lymphadenopathy. Dedicated liver imaging reveals a stricture in the common bile duct but no stones. He also has a history of parotiditis. What is the most likely diagnosis?

- ☐ Lymphoma
- ☐ IgG4 disease
- ☐ Pancreatic cancer
- ☐ Biliary malignancy
- ☐ Primary sclerosing cholangitis

IgG4 disease	40%
Pancreatic cancer	4%
Biliary malignancy	8%
Primary sclerosing cholangitis	29%

IgG4-related disease has been described in virtually every organ system: the biliary tree, salivary glands, periorbital tissues, kidneys, lungs, lymph nodes, meninges, aorta, breast, prostate, thyroid, pericardium, and skin. The histopathological features are similar across organs, regardless of the site. IgG4-related disease is analogous to sarcoidosis, in which diverse organ manifestations are linked by similar histopathological characteristics. Raised concentrations of IgG4 in tissue and serum can be helpful in diagnosing IgG4 disease, but neither is a specific diagnostic marker.

Examples include:

- Riedel's Thyroiditis
- Autoimmune pancreatitis
- Mediastinal and Retroperitoneal Fibrosis
- Periaortitis/periarteritis/Inflammatory aortic aneurysm
- Kuttner's Tumour (submandibular glands) & Mikulicz Syndrome (salivary and lacrimal glands)
- Possibly sjogren's and primary biliary cirrhosis

A 24-year-old man is diagnosed with a deep vein thrombosis of his right leg. He is initially treated with low-molecular weight heparin but is switched after three days to warfarin. He then develops necrotic skin lesions on his lower limbs and forearms. Which one of the following conditions is characteristically associated with this complication?

- ☐ Protein S deficiency
- ☐ Antiphospholipid syndrome
- ☐ Antithrombin III deficiency
- ☐ Activated protein C resistance
- ☐ Protein C deficiency

Protein S deficiency

11%

Antiphospholipid syndrome

9%

Antithrombin III deficiency

17%

Activated protein C resistance

23%

Protein C deficiency

41%

What is the mechanism of action of cisplatin?

- ☐ Stabilises DNA-topoisomerase II complex
- ☐ Causes cross-linking in DNA
- ☐ Inhibits ribonucleotide reductase
- ☐ Inhibits purine synthesis
- ☐ Inhibits formation of microtubules

Stabilises DNA-topoisomerase II complex

9%

Causes cross-linking in DNA

59%

Inhibits ribonucleotide reductase

7%

Inhibits purine synthesis

7%

Inhibits formation of microtubules

18%

Cisplatin - causes cross-linking in DNA

Important for me Less important

A 54-year-old man who is about to start chemotherapy for a high-grade lymphoma is given intravenous rasburicase to help lower the risk of tumour lysis syndrome. What is the mechanism of action of this drug?

- ☐ Inhibits urate oxidase
- ☐ Converts uric acid to allantoin
- ☐ Inhibits xanthine oxidase
- ☐ Converts uric acid to hypoxanthine
- ☐ Guanylic oxidase inhibitor

Inhibits urate oxidase

14%

Converts uric acid to allantoin

57%

Inhibits xanthine oxidase

17%

Converts uric acid to hypoxanthine

8%

Guanylic oxidase inhibitor

4%

Rasburicase - a recombinant version of urate oxidase, an enzyme that metabolizes uric acid to allantoin

Important for me

Less important

A 62-year-old male presents with a 2-month history of symptoms of fatigue and dyspnoea. The patient is visibly jaundiced and on abdominal examination you notice the spleen is palpable. Blood tests reveal:

Hb	98 g/l
MCV	88 fl
Direct Coombs test	Pos

An antibody specificity test is requested and a diagnosis of warm autoimmune haemolytic anaemia is made.

Which immunoglobulin is most likely mediating this?

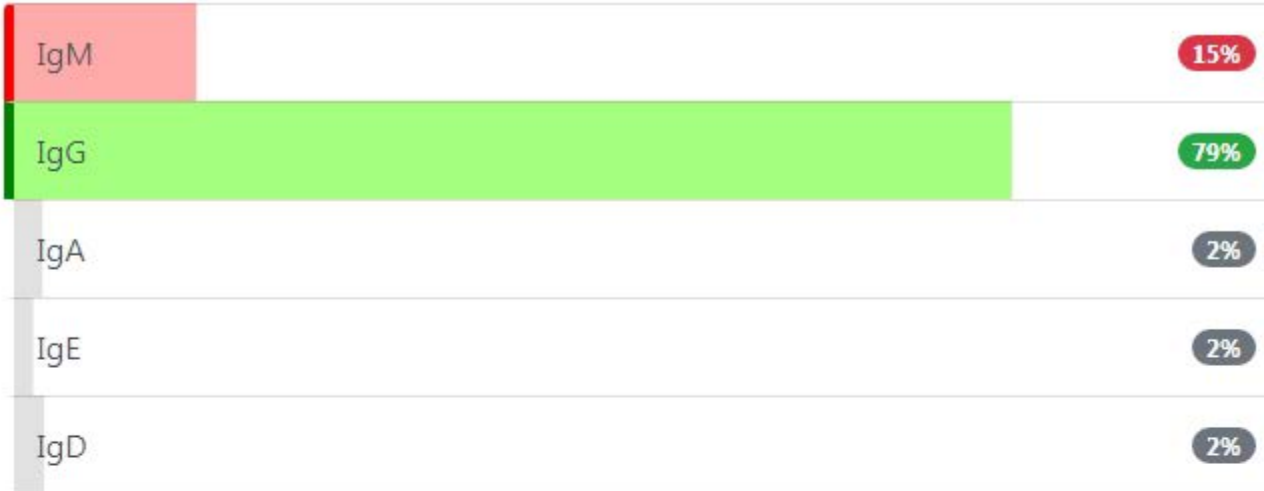
☒ IgM

☐ IgG

☐ IgA

☐ IgE

☐ IgD



Warm autoimmune haemolytic anaemia involves IgG-mediated haemolysis

Important for me Less important

Warm autoimmune haemolytic anaemia involves IgG-mediated red blood cell destruction at body temperature with work-induced splenomegaly due to extravascular haemolysis.

Episodes of IgM-mediated haemolysis are precipitated by the cold and characteristically present with symptoms involving the hands and feet.

IgA, IgE and IgD are not common antibody mediators of autoimmune haemolytic anaemia.

A 32-year-old demolitions worker comes to the haematology clinic for review. He has suffered from abdominal pain and lethargy for the past few months, and his GP has noted a microcytic anaemia. Over the past few weeks he has begun tripping over because of weakness of both lower legs. His blood pressure is 123/82 mmHg, pulse is 82 beats per minute and regular. The abdomen is soft and non-tender, the body mass index is 23 kg/m² and there is bilateral weakness of ankle dorsiflexion.

Investigations show the following:

Hb	98 g/l
MCV	77 fL
Blood film	Basophilic stippling
Platelets	203 * 10 ⁹ /l
WBC	7.1 * 10 ⁹ /l

What is the most likely diagnosis?

- ☐ Iron deficiency anaemia
- ☐ Lead poisoning
- ☐ Porphyria cutanea tarda
- ☐ Thalassaemia trait
- ☐ Wilson's disease

Dr Assem

Iron deficiency anaemia	3%
Lead poisoning	82%
Porphyria cutanea tarda	7%
Thalassaemia trait	5%
Wilson's disease	3%

The picture here with microcytic anaemia, basophilic stippling on the blood film, and peripheral motor neuropathy is consistent with lead poisoning. It's likely this patient was exposed during their work as a demolitions operative. Chelation therapy is the intervention of choice, with EDTA, DMSA and penicillamine all potential options.

The other conditions aren't associated with basophilic stippling. In addition, porphyria is associated with a photosensitive skin rash, and thalassaemia trait isn't associated with clinical symptoms. Wilson's tends to present earlier with either movement disorder or psychiatric symptoms.

A 25-year-old female presents with recurrent sinopulmonary infections. What test is most likely to confirm a primary immunodeficiency?

☐ IgG level

☐ B cell level

☐ T cell level

☐ Complement (CH50) assay

☐ IgM level



The most common clinically significant primary immunodeficiency is common variable immunodeficiency or CVID. IgA deficiency is more common, but most are asymptomatic. CVID is characterized by reduced serum immunoglobulins and heterogeneous clinical features. A well-accepted definition of CVID includes three key features: the presence of hypogammaglobulinaemia of two or more immunoglobulin isotypes (low IgG, IgA, or IgM), recurrent sinopulmonary infections, and impaired functional antibody responses. However, IgG is more likely to be deficient than IgM.

The criteria for impaired functional antibody responses include absent isohaemagglutinins (eg. antibodies associated with blood transfusion reactions), poor responses to protein (diphtheria, tetanus) or polysaccharide vaccines (S pneumoniae), or both.

Mature B-cells are more likely to be absent in X-linked Bruton's agammaglobulinemia.

Dr Assem

A 40-year-old lady presents with fatigue, shortness of breath and palpitations. She has a history of hypothyroidism and migraine. On examination, she is comfortable at rest with normal cardiovascular, respiratory and abdominal examination although her conjunctiva appears pale.

Her full blood count results are shown below:

Hb	98 g/l
Platelets	$146 \times 10^9/l$
WBC	$3.5 \times 10^9/l$

On further testing, her MCV is 101 fL and her blood film displays hypersegmented polymorphs.

What would be the most appropriate next set of investigations?

- ☐ Folate levels and anti-gastric parietal cell antibodies
- ☐ Schilling test
- ☐ Iron studies
- ☐ Folate levels and LDH
- ☐ Colonoscopy

Folate levels and anti-gastric parietal cell antibodies

69%

Schilling test

17%

Iron studies

4%

Folate levels and LDH

8%

Colonoscopy

2%

This patient has a macrocytic anaemia due to B12 deficiency demonstrated by the low B12 levels and hypersegmented polymorphs on blood film. The next step is to identify the cause of the B12 deficiency by investigating for pernicious anaemia and checking folate levels (combined B12 and folate deficiency are common). Anti-gastric parietal cell antibodies are present in 90% patients with PA (but also 5-10% patients without PA). Other tests for PA are anti-intrinsic factor antibodies which are more specific but less sensitive than anti-parietal cell antibodies (present in 50%). In the past, Schilling tests using radioisotope labelled B12 were used.

Explanation for other options:

- 2. Schilling test no longer used in clinical practice due to shortage of B12 radioisotope and less invasive means of testing available
- 3. Folate levels are useful and LDH would be raised in pernicious anaemia but this is a non-specific finding and does not aid diagnosis
- 4. Colonoscopy not indicated at this stage and would be more useful in a microcytic anaemia when GI blood loss would be a possible cause
- 5. This patient has a macrocytic rather than microcytic anaemia (which would fit with iron deficiency)

A patient is started on cyclophosphamide for vasculitis associated with Wegener's granulomatosis. Which of the following is most characteristically associated with cyclophosphamide?

- ☐ Haemorrhagic cystitis
- ☐ Cardiomyopathy
- ☐ Ototoxicity
- ☐ Alopecia
- ☐ Weight gain

Haemorrhagic cystitis

81%

Cardiomyopathy

6%

Ototoxicity

6%

Alopecia

4%

Weight gain

3%

Cyclophosphamide may cause haemorrhagic cystitis

Important for me Less important

A 48-year-old who was initially investigated for having an abdominal mass is diagnosed as having Burkitt's lymphoma. He is due to start chemotherapy today. Which one of the following should be given prior to his chemotherapy to reduce the risk of tumour lysis syndrome?

- ☐ Rasburicase
- ☐ Allopurinol
- ☐ Sodium bicarbonate
- ☐ Albumin
- ☐ Calcium gluconate

Rasburicase

62%

Allopurinol

28%

Sodium bicarbonate

4%

Albumin

2%

Calcium gluconate

4%

Each one of the following is associated with iron-deficiency anaemia, except:

- ☐ Atrophic glossitis
- ☐ Onycholysis
- ☐ Post-cricoid webs
- ☐ Koilonychia
- ☐ Angular stomatitis

Atrophic glossitis

14%

Onycholysis

51%

Post-cricoid webs

17%

Koilonychia

7%

Angular stomatitis

12%

A 64-year-old man is referred to the oncology clinic with progressively worsening lower back pain over the last 3 months. He also reports an 8-month history of weight loss. MRI lumbar spine confirms the suspicion of bone metastasis.

What is the most likely primary tumour?

- ☐ Leukaemia
- ☐ Breast carcinoma
- ☐ Colorectal carcinoma
- ☐ Prostate carcinoma
- ☐ Lung carcinoma



Prostate cancer is the most common primary tumour that metastasises to the bone

Important for me Less important

Prostate cancer is the most common primary tumour that metastasises to the bone

It is unusual to have bone metastasis in leukaemia.

Breast, colorectal and lung cancers can all lead to bone metastasis but the question is asking for the most likely tumour and statistically speaking, prostate cancer is the most common primary tumour that metastasises to the bone.

A 66-year-old woman is referred by her GP with anaemia. She has been feeling generally unwell for the past 3 weeks. Bloods on admission show:

Hb	8.7 g/dl
MCV	87 fl
Plt	$198 \times 10^9/l$
WBC	$5.3 \times 10^9/l$

Further tests were then ordered:

Reticulocytes	5.2%
Direct antiglobulin test	Positive, IgG only
Film	Spherocytes and reticulocytes

Which one of the following is the most likely underlying cause?

- ☐ Non-Hodgkin's lymphoma
- ☐ Mycoplasma pneumonia
- ☐ Chronic myeloid leukaemia
- ☐ Acute myeloid leukaemia subtype M3
- ☐ Cytomegalovirus infection

Non-Hodgkin's lymphoma	32%
Mycoplasma pneumonia	18%
Chronic myeloid leukaemia	22%
Acute myeloid leukaemia subtype M3	14%
Cytomegalovirus infection	15%

The blood results suggest warm autoimmune haemolytic anaemia (AIHA) which may be caused by non-Hodgkin's lymphoma. Mycoplasma pneumonia is associated with cold AIHA. The other three listed conditions are not commonly associated with AIHA.

A 65-year-old male patient presents to the oncology clinic with 6-months history of weight loss and anorexia. A tumour marker profile shows an elevated level of bombesin.

What is the most likely cancer to account for this result?

- ☐ Rectal carcinoma
- ☐ Prostate carcinoma
- ☐ Breast carcinoma
- ☐ Small cell lung carcinoma
- ☐ Lymphoma

Rectal carcinoma

8%

Prostate carcinoma

5%

Breast carcinoma

4%

Small cell lung carcinoma

68%

Lymphoma

14%

Bombesin is a tumour marker in small cell lung carcinomas

Important for me [Less important](#)

Small cell lung carcinomas are the only option which could cause a raised level of bombesin. Bombesin is a tumour marker in small cell lung carcinomas, along with gastric carcinomas and retinoblastomas.

Carcinoembryonic antigen(CEA) is a tumour marker of colorectal cancer.

Prostate-specific antigen(PSA) is a tumour marker of prostate carcinomas.

CA 15-3 is a tumour marker for breast cancer.

There is no specific tumour marker for lymphoma.

A 28-year-old female patient presents to the emergency department with abdominal pain, diarrhoea and progressive weakness and pain in the limbs. She looks low in mood and tearful at times. You ask for a urine sample and leaves it standing near the window. 20 minutes later, you notice that the urine has become darker.

What is the most likely diagnosis?

- ☐ Porphyrria cutanea tarda
- ☐ Lead poisoning
- ☐ Acute intermittent porphyria
- ☐ Polymyalgia rheumatica
- ☐ Guillain-Barré syndrome

Lead poisoning

10%

Acute intermittent porphyria

73%

Polymyalgia rheumatica

2%

Guillain-Barré syndrome

3%

In acute intermittent porphyria, the urine classically turns deep red on standing

Important for me Less important

This patient has recurrent gastrointestinal symptoms associated with neuropsychiatric features. This raises the suspicion of acute intermittent porphyria (AIP). In AIP, the urine classically turns deep red on standing following sun exposure.

Lead poisoning can present with similar presentation but the darkening of urine on sun exposure is only found in AIP.

Porphyria cutanea tarda presents with photosensitive skin bullae.

Polymyalgia rheumatica may present with proximal limb weakness but does not result in the urinary phenomenon described.

Guillain-barré syndrome can develop following gastrointestinal symptoms, however, it does not cause the urine to turn red.

What is the underlying problem in methaemoglobinaemia?

- ☐ The oxidation of Fe^{2+} in haemoglobin to Fe^{3+}
- ☐ The reduction of Fe^{2+} in haemoglobin to Fe^{+}
- ☐ The oxidation of Fe^{3+} in haemoglobin to Fe^{2+}
- ☐ The reduction of Fe^{2+} in haemoglobin to Fe^{3+}
- ☐ The reduction of Fe^{3+} in haemoglobin to Fe^{2+}

What is the underlying problem in methaemoglobinaemia?

The oxidation of Fe^{2+} in haemoglobin to Fe^{3+}

57%

The reduction of Fe^{2+} in haemoglobin to Fe^{+}

5%

The oxidation of Fe^{3+} in haemoglobin to Fe^{2+}

10%

The reduction of Fe^{2+} in haemoglobin to Fe^{3+}

18%

The reduction of Fe^{3+} in haemoglobin to Fe^{2+}

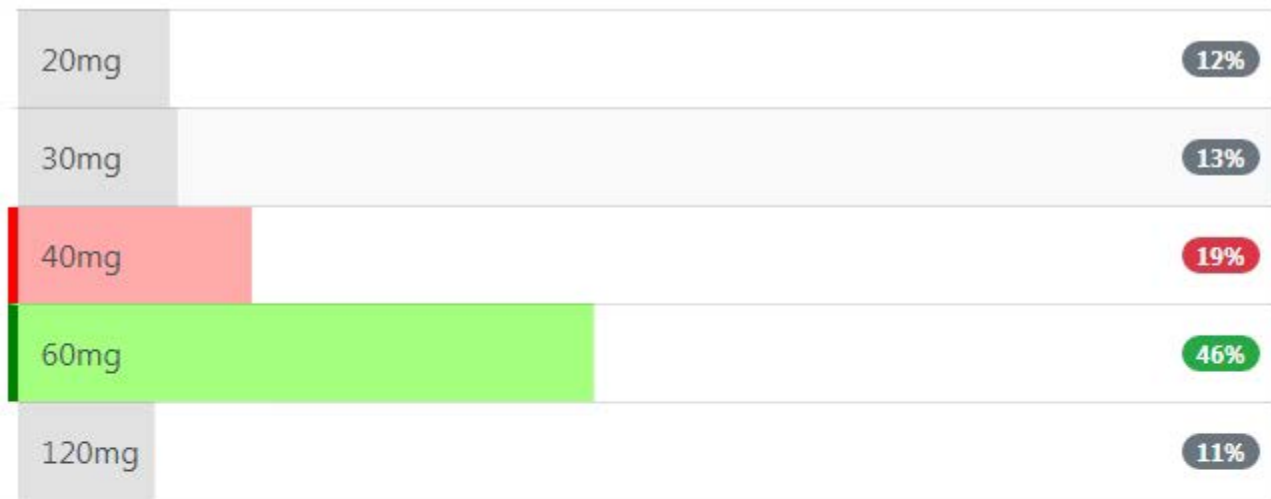
10%

Methaemoglobinaemia = oxidation of Fe^{2+} in haemoglobin to Fe^{3+}

Important for me Less important

A 69-year-old man with metastatic prostate cancer presents with worsening pain. He currently takes oral modified-release morphine sulphate 60mg bd but it is decided to convert this to subcutaneous administration as he is frequently vomiting. What is the most appropriate dose of morphine to give over a 24 hour period using a continuous subcutaneous infusion?

- ☐ 20mg
- ☐ 30mg
- ☐ 40mg
- ☐ 60mg
- ☐ 120mg



The BNF recommend half the oral dose of morphine in this situation:

The equivalent parenteral dose of morphine (subcutaneous, intramuscular, or intravenous) is about half of the oral dose. If the patient becomes unable to swallow, generally morphine is administered as a continuous subcutaneous infusion

This patient is on 60mg bd = 120mg. Divided by 2 = 60mg of subcutaneous morphine.

A 61-year-old presents for review. She has been having atypical lower back pain for the past two months. An x-ray of her lumbar spine reported raised the possibility of spinal metastases but there is no current evidence of a primary tumour. A series of tumour markers were sent. Which one of the following is most associated with raised levels of CA 15-3?

- ☐ Pancreatic cancer
- ☐ Colorectal cancer
- ☐ Breast cancer
- ☐ Ovarian cancer
- ☐ Hepatocellular carcinoma

Pancreatic cancer

9%

Colorectal cancer

3%

Breast cancer

78%

Ovarian cancer

7%

Hepatocellular carcinoma

3%

CA 15-3 is a tumour marker in breast cancers

Important for me

Less important

A 54-year-old gentleman is diagnosed with diffuse large B-cell lymphoma and is started on chemotherapy. Two days following his first treatment, he presents to the emergency department with nausea, vomiting, and myalgia. On examination, he appears clinically dehydrated. A diagnosis of tumour lysis syndrome (TLS) is suspected. Which of the following would be in keeping with this diagnosis?

- ☐ Low phosphate
- ☐ Low uric acid
- ☐ Low lactate dehydrogenase (LDH)
- ☐ Low creatinine
- ☐ Low corrected calcium



Of the choices, low corrected calcium is the only biochemistry result which would be in keeping with TLS. All of the other biochemistry markers are elevated in TLS. TLS can occur when a large amount of cancer cells are destroyed, causing a release of their intra-cellular content into the bloodstream. This occurs due to chemotherapy, but can also occur without chemotherapy. Potassium and phosphate are released from the cells, causing both to be high. As phosphate precipitates calcium, the serum concentration of calcium becomes low.

Source:

Larson, Richard A., and Ching-Hon Pui. 'Tumor Lysis Syndrome: Prevention and Treatment.' UpToDate. 4 Oct. 2016. 5

Dr Assem

A woman is prescribed docetaxel as part of her chemotherapy for breast cancer. What is the mechanism of action of docetaxel?

- ☐ Inhibits RNA synthesis
- ☐ Stabilizes DNA-topoisomerase II complex
- ☐ Prevents microtubule disassembly
- ☐ Inhibits formation of microtubules
- ☐ Causes cross-linking in DNA

Inhibits RNA synthesis

8%

Stabilizes DNA-topoisomerase II complex

15%

Prevents microtubule disassembly

40%

Inhibits formation of microtubules

26%

Causes cross-linking in DNA

11%

Taxanes such as docetaxel - prevents microtubule depolymerisation & disassembly, decreasing free tubulin

Important for me Less important

Like other taxanes the principal mechanism of action is the prevention of microtubule disassembly.

A 27-year-old male is receiving cyclophosphamide as part of his chemotherapy for non-Hodgkin' lymphoma. What is the most appropriate management to reduce the likelihood of haemorrhagic cystitis?

- ☐ Hydration + tranexamic acid
- ☐ Hydration + twice-daily bladder washouts
- ☐ Hydration + prophylactic antibiotics
- ☐ Hydration + twice-daily bladder washouts + prophylactic antibiotics
- ☐ Hydration + mesna

Hydration + tranexamic acid	14%
Hydration + twice-daily bladder washouts	9%
Hydration + prophylactic antibiotics	8%
Hydration + twice-daily bladder washouts + prophylactic antibiotics	9%
Hydration + mesna	61%

Cyclophosphamide - haemorrhagic cystitis - prevent with mesna

Important for me Less important

Cyclophosphamide may be converted to urotoxic metabolites such as acrolein. Mesna binds to these metabolites through its sulphhydryl-moieties and reduces the incidence of haemorrhagic cystitis

Regarding the Ann-Arbor classification of Hodgkin's lymphoma, which one of the following would be staged as IIIB?

- ☐ Nodes on both sides of diaphragm with pruritus
- ☐ Two or more lymph nodes on the same side of the diaphragm with pruritus
- ☐ Nodes on both sides of diaphragm with night sweats
- ☐ Two or more lymph nodes on the same side of the diaphragm with night sweats
- ☐ Two or more lymph nodes on the same side of the diaphragm with no systemic symptoms

Nodes on both sides of diaphragm with pruritus

11%

Two or more lymph nodes on the same side of the diaphragm with pruritus

4%

Nodes on both sides of diaphragm with night sweats

66%

Two or more lymph nodes on the same side of the diaphragm with night sweats

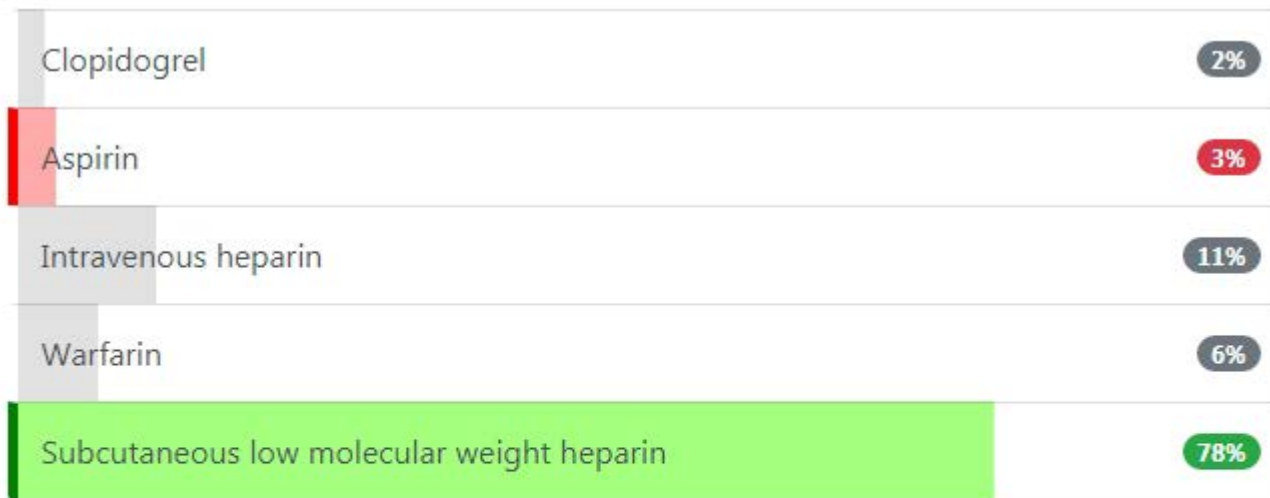
15%

Two or more lymph nodes on the same side of the diaphragm with no systemic symptoms

4%

A 35-year-old female who is 34 weeks pregnant presents with a swollen, painful right calf. A deep vein thrombosis is confirmed on Doppler scan. What is the preferred anticoagulant?

- ☐ Clopidogrel
- ☐ Aspirin
- ☐ Intravenous heparin
- ☐ Warfarin
- ☐ Subcutaneous low molecular weight heparin



Although teratogenic effects of warfarin are greater in the first trimester most clinicians would use low molecular weight heparin in this situation. Another factor to consider is the risk of peripartum haemorrhage and potential problems reversing the effects of warfarin if this occurred

A 69-year-old man with terminal lung cancer is reviewed. He currently takes MST 60mg bd for pain. He has become unable to take oral medications and a decision is made to set-up a syringe driver. What dose of diamorphine should be prescribed for the syringe driver?

☐ 60 mg

☐ 40 mg

☒ 120 mg

☐ 30 mg

☐ 20 mg

60 mg

26%

40 mg

36%

120 mg

8%

30 mg

17%

20 mg

14%

To convert from oral morphine to diamorphine the total daily morphine dose ($60 \times 2 = 120\text{mg}$) should be divided by 3 ($120 / 3 = 40\text{mg}$)

A 45-year-old woman is diagnosed with non-Hodgkin's lymphoma. She is a recovering alcoholic and has been left with significant alcohol-related peripheral neuropathy. Which one of the following chemotherapy agents should be avoided if possible, given her past history?

☐ Doxorubicin

☐ Vincristine

☐ Chlorambucil

☐ Docetaxel

☐ Cyclophosphamide

Doxorubicin

7%

Vincristine

76%

Chlorambucil

6%

Docetaxel

6%

Cyclophosphamide

5%

Vincristine - peripheral neuropathy

Important for me Less important

Which one of the following therapeutic options is least recognised in the treatment of aplastic anaemia?

- ☐ Interferon-alpha
- ☐ Stem cell transplantation
- ☐ Anti-lymphocyte globulin
- ☐ Anti-thymocyte globulin
- ☐ Platelet transfusion

Interferon-alpha

37%

Stem cell transplantation

4%

Anti-lymphocyte globulin

18%

Anti-thymocyte globulin

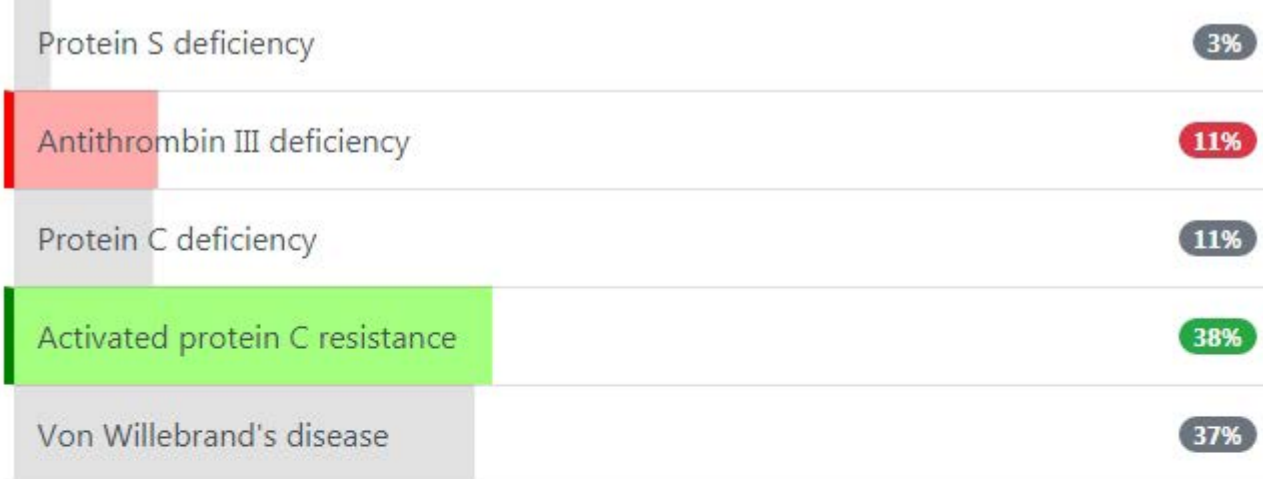
19%

Platelet transfusion

21%

Which one of the following is the most common inherited thrombophilia?

- ☐ Protein S deficiency
- ☐ Antithrombin III deficiency
- ☐ Protein C deficiency
- ☐ Activated protein C resistance
- ☐ Von Willebrand's disease



Activated protein C resistance (Factor V Leiden) is the most common inherited thrombophilia

Important for me Less important

Activated protein C resistance is due a point mutation in the Factor V gene, encoding for the Leiden allele. Heterozygotes have a 5-fold risk of venous thrombosis whilst homozygotes have a 50-fold increased risk

Von Willebrand's disease is the most common inherited bleeding disorder

A patient is diagnosed with acute lymphoblastic leukaemia after presenting with lethargy and easy bruising. Which one of the following is a marker of a bad prognosis in acute lymphoblastic leukaemia?

- ☐ Pre-B phenotype
- ☐ Presentation in childhood
- ☐ Initial white cell count of $18 \times 10^9/l$
- ☐ Female sex
- ☐ Philadelphia chromosome positive

Pre-B phenotype

13%

Presentation in childhood

5%

Initial white cell count of 18×10^9

9

/l

11%

Female sex

5%

Philadelphia chromosome positive

66%

Philadelphia translocation, t(9;22) - good prognosis in CML, poor prognosis in AML + ALL

Important for me Less important

A 14-year-old girl is admitted to the Emergency Department. Over the past hour she has developed a painless, non-pruritic erythematous rash associated with severe angioedema. She has a past medical history of recurrent abdominal pain. Her symptoms fail to respond to adrenaline and she is therefore intubated to protect the airway. She is discharged from ITU after three days. During outpatient follow-up two weeks later a diagnosis of hereditary angioedema is suspected. What is the most appropriate screening test to perform?

- ☐ Serum IgE levels
- ☐ Serum C3 levels
- ☐ Serum tryptase levels
- ☐ Serum C4 levels
- ☐ Serum C1-INH levels

Serum IgE levels

4%

Serum C3 levels

5%

Serum tryptase levels

8%

Serum C4 levels

34%

Serum C1-INH levels

49%

Hereditary angioedema - C4 is the best screening test inbetween attacks

Important for me Less important

A 45-year-old woman who is being treated for Hodgkin's lymphoma with ABVD chemotherapy is reviewed on the haematology ward.

Six days ago she was admitted with a fever of 38.9°C. After admission she was immediately started on piperacillin with tazobactam (Tazocin). Her blood count on arrival was as follows:

Hb	10.1 g/dl
Platelets	$311 \times 10^9/l$
WBC	$0.8 \times 10^9/l$
Neutrophils	$0.35 \times 10^9/l$
Lymphocytes	$0.35 \times 10^9/l$

After 48 hours she remained febrile and tachycardic, Tazocin was stopped and meropenem + vancomycin prescribed.

Today, six days after being admitted she remains unwell with a temperature of 38.4°C. Blood pressure is 102/66 mmHg and the heart rate is 96/min. Respiratory examination remains unremarkable and blood/urine cultures have failed to show any cause for the fever. What is the most appropriate next step?

- ☐ Add amphotericin B
- ☐ Add G-CSF
- ☐ Add gentamicin
- ☐ Add aciclovir
- ☐ Refer for a stem cell transplant

Add amphotericin B	52%
Add G-CSF	28%
Add gentamicin	4%
Add aciclovir	11%
Refer for a stem cell transplant	6%

This patient meets the diagnostic criteria for neutropenic sepsis. After failing to respond to standard empirical treatment the question is what to do next.

There are no guidelines that can fit every patient & scenario. The decision to use antifungals is now often taken after risk stratifying patients and ordering investigations such as HRCT, Aspergillus PCR etc to determine the likelihood of systemic fungal infection. For the purposes of the exam however the answer is often to give antifungals empirically.

G-CSF is not used routinely in neutropenic sepsis.

Of the following options, which one is the best diagnostic test for paroxysmal nocturnal haemoglobinuria?

- ☐ Osmotic fragility test
- ☐ FMC-7 staining
- ☐ PAS staining of erythrocytes
- ☐ Flow cytometry for CD59 and CD55
- ☐ Immunophenotyping for CD19 and CD20

Osmotic fragility test

10%

FMC-7 staining

4%

PAS staining of erythrocytes

11%

Flow cytometry for CD59 and CD55

69%

Immunophenotyping for CD19 and CD20

6%

Flow cytometry of blood to detect low levels of CD59 and CD55 has now replaced Ham's test as the gold standard investigation in paroxysmal nocturnal haemoglobinuria

Which one of the following is the most common type of Hodgkin's lymphoma?

☐ Lymphocyte predominant

☐ Nodular sclerosing

☐ Lymphocyte depleted

☐ Mixed cellularity

☐ Hairy cell

Lymphocyte predominant

27%

Nodular sclerosing

59%

Lymphocyte depleted

3%

Mixed cellularity

7%

Hairy cell

4%

Hodgkin's lymphoma - most common type = nodular sclerosing

Important for me

Less important

What chemical mediator is mainly responsible for the tissue oedema seen in patients in hereditary angioedema?

- ☐ Histamine
- ☐ Serotonin
- ☐ Neurokinin A
- ☐ Bradykinin
- ☐ Nitric oxide

Histamine

9%

Serotonin

3%

Neurokinin A

8%

Bradykinin

77%

Nitric oxide

4%

A 71-year-old woman with metastatic breast cancer comes to surgery with her husband. She is known to have bone metastases in her pelvis and ribs but her pain is not controlled with a combination of paracetamol, diclofenac and MST 30mg bd. Her husband reports she is using 10mg of oral morphine solution around 6-7 times a day for breakthrough pain. The palliative care team at the hospice tried using a bisphosphonate but this unfortunately resulted in persistent myalgia and arthralgia. What is the most appropriate next step?

- ☐ Switch to oxycodone
- ☐ Increase MST
- ☐ Increase MST + add dexamethasone
- ☐ Increase MST + suggest course of complimentary therapies
- ☐ Increase MST + refer for radiotherapy

Switch to oxycodone

13%

Increase MST

6%

Increase MST + add dexamethasone

21%

Increase MST + suggest course of complimentary therapies

8%

Increase MST + refer for radiotherapy

53%

Metastatic bone pain may respond to analgesia, bisphosphonates or radiotherapy

Important for me Less important

Dexamethasone should be considered if the metastatic spinal cord compression, but this is not a feature given the location of the lesions.

A 58-year-old man is reviewed in clinic. Six months ago he had a Whipple procedure for pancreatic cancer and is currently undergoing chemotherapy. Which one of the following blood tests is most useful in monitoring his disease?

☐ CA 15-3 levels

☐ Faecal elastase

☐ CA 125 levels

☐ Amylase levels

☐ CA 19-9 levels

CA 15-3 levels

3%

Faecal elastase

4%

CA 125 levels

3%

Amylase levels

2%

CA 19-9 levels

88%

Pancreatic cancer - CA 19-9

Important for me Less important

A 75-year-old male patient has metastatic colorectal cancer. He spends most of his day resting in bed or in his chair and requires assistance with his activities of daily living. What is his Eastern Cooperative Oncology Group (ECOG) score?

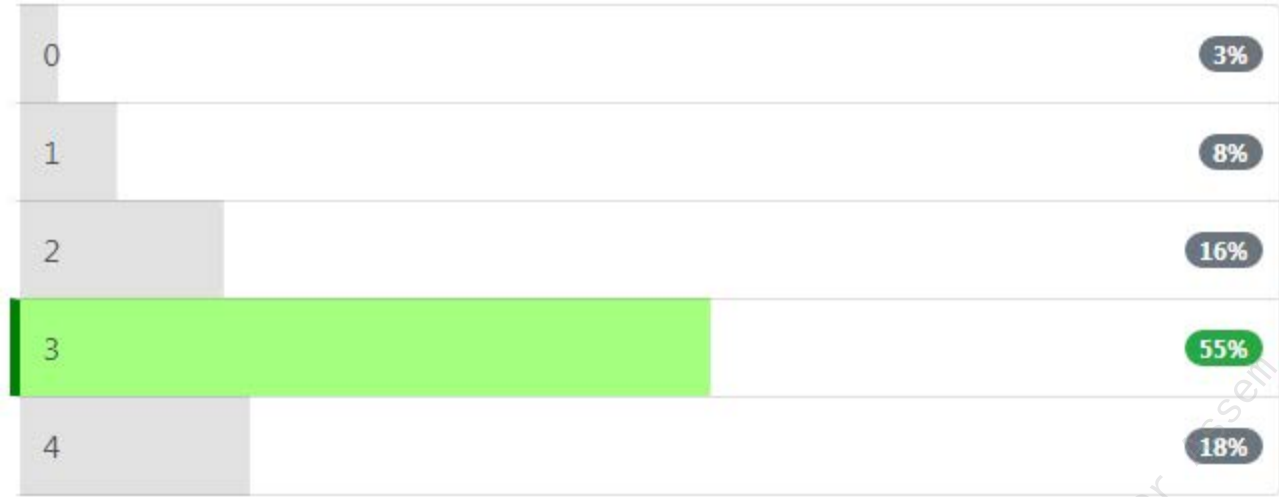
☐ 0

☐ 1

☐ 2

☐ 3

☐ 4

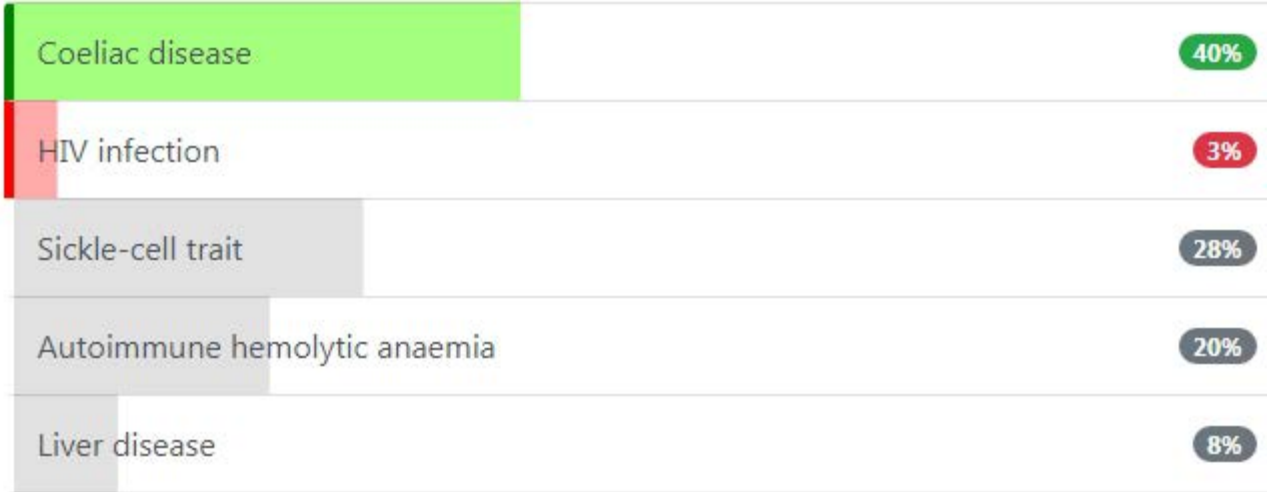


A full blood count for a 38-year-old man is reported as follows:

Hb	12.9 g/dl
Platelets	$225 \times 10^9/l$
WBC	$6.2 \times 10^9/l$
Film	Numerous Howell-Jolly bodies and pencil cells seen

Which one of the following conditions is most likely to produce these results?

- ☐ Coeliac disease
- ☐ HIV infection
- ☐ Sickle-cell trait
- ☐ Autoimmune hemolytic anaemia
- ☐ Liver disease



Howell-Jolly bodies are seen in hyposplenism and pencil cells are a feature of iron-deficiency. Both of these are seen in coeliac disease.

You review a 65-year-old woman in oncology clinic. She has known metastatic breast cancer, and has received a mastectomy, chemotherapy and radiotherapy.

She has complained of headaches and nausea for the last 7 days, which are worse in the mornings. A CT head showed multiple brain metastases, with compression of the ventricles and sulci.

Your patient declines further chemotherapy or radiotherapy. She is currently taking opioid painkillers.

Which of the following medications can be used as an adjunct to further relieve her symptoms?

- ☐ Ondansetron
- ☐ Cyclizine
- ☐ Dexamethasone
- ☐ Haloperidol
- ☐ Sumatriptan

Ondansetron	23%
Cyclizine	4%
Dexamethasone	64%
Haloperidol	5%
Sumatriptan	4%

Headache caused by raised intracranial pressure due to brain cancer (or metastases) can be palliated with dexamethasone

Important for me Less important

Dexamethasone is used to reduce oedema around brain metastases, to palliate symptoms of raised intracranial pressure.

Ondansetron, cyclizine and haloperidol are all effective agents for nausea, but would not treat the root cause.

Sumatriptan is a treatment for migraines and has no role here.

You are the haematology registrar. A 42-year-old lady has been referred by her GP with a persistently elevated platelet count. It was incidentally found on a blood test originally six months ago at $632 \times 10^9/L$. The latest reading was $848 \times 10^9/L$ which was the highest it has been yet. She is otherwise well but does suffer with regular headaches which she takes simple analgesia for. You suspect a diagnosis of essential thrombocythosis and arrange a JAK-2 test which is negative (including an exon 12 test). Which is the most likely other gene mutation responsible for this condition?

- ☐ BCR-ABL
- ☐ MPL
- ☐ CMYC
- ☐ Platelet factor 4
- ☐ CALR



CALR (calreticulin) is a more commonly found gene mutation in ET in around 20% of JAK-2 negative patients.

MPL (myeloproliferative leukaemia protein) is less common at less than 10%.

BCR-ABL is associated with the myeloproliferative disorder chronic myeloid leukaemia.

CMYC is a proto-oncogene associated with many malignancies including Burkitt's lymphoma.

Platelet factor 4 (PF4 complex) is the antigen found in heparin-induced thrombocytopenia.

Dr Assem

Which of the following is a cause of intravascular haemolysis?

- ☐ Hereditary spherocytosis
- ☐ Sickle cell anaemia
- ☐ Paroxysmal nocturnal haemoglobinuria
- ☐ Haemolytic disease of the newborn
- ☐ Warm autoimmune haemolytic anaemia

Hereditary spherocytosis

10%

Sickle cell anaemia

10%

Paroxysmal nocturnal haemoglobinuria

53%

Haemolytic disease of the newborn

9%

Warm autoimmune haemolytic anaemia

17%

Intravascular haemolysis - paroxysmal nocturnal haemoglobinuria

Important for me

Less important

A patient develops methaemoglobinaemia after being prescribed isosorbide mononitrate. Which substance is most likely to be depleted?

- ☐ Pyruvate kinase
- ☐ Hyponitrite reductase
- ☐ Pyridoxine 5-dehydrogenase
- ☐ Glucose-6-phosphate dehydrogenase
- ☐ NADH

Pyruvate kinase

13%

Hyponitrite reductase

7%

Pyridoxine 5-dehydrogenase

11%

Glucose-6-phosphate dehydrogenase

16%

NADH

52%

Which one of the following is not a recognised feature of methaemoglobinaemia?

- ☐ Dyspnoea
- ☐ 'Chocolate' cyanosis
- ☐ Anxiety
- ☐ Reduced pO₂ but normal oxygen saturation on pulse oximetry
- ☐ Acidosis

Dyspnoea

7%

'Chocolate' cyanosis

8%

Anxiety

18%

Reduced pO_2 but normal oxygen saturation on pulse oximetry

44%

Acidosis

21%

Normal pO_2 but decreased oxygen saturation is characteristic of methaemoglobinaemia

Important for me [Less Important](#)

A 48-year-old female presents to her family physician complaining of post-coital pain. She initially thought that this was related to her age but recently she has been feeling a constant dull pain in her pelvis. She also reports having a foul-smelling discharge from her vagina. Her past medical and surgical history reveal nothing significant along but she says that she has had several sexual partners in her early teenage years and twenties. She currently smokes about 10 cigarettes a day for the past 10 years and does not consume alcohol. On examination, the doctor finds an irregular mass on her cervix. Which of the following best describes the mechanism for the strongest risk factor for this patient's condition?

- Human papilloma virus 16 and 18 produces oncoproteins which causes inhibition of the tumor suppressor genes causing cervical carcinoma
- Cigarette smoking produces dysplasia of the squamocolumnar junction leading to cervical cancer
- Having multiple sexual partners increase the risk of getting HIV which then expresses viral proteins leading to cervical dysplasia and carcinoma
- Human papilloma virus 16 and 18 produces oncoproteins which then activate oncogenes causing cervical carcinoma
- The patients age is the strongest risk factor as the cervical cells lose their repair capacity and then progress on to dysplasia and carcinoma

Human papilloma virus 16 and 18 produces oncoproteins which causes inhibition of the tumor suppressor genes causing cervical carcinoma

50%

Cigarette smoking produces dysplasia of the squamocolumnar junction leading to cervical cancer

5%

Having multiple sexual partners increase the risk of getting HIV which then expresses viral proteins leading to cervical dysplasia and carcinoma

6%

Human papilloma virus 16 and 18 produces oncoproteins which then activate oncogenes causing cervical carcinoma

36%

The patient's age is the strongest risk factor as the cervical cells lose their repair capacity and then progress on to dysplasia and carcinoma

3%

This patient has presented with the signs and symptoms typical of a cervical carcinoma. The onset of a constant dull pelvic pain indicates a possible invasion of pelvic structures and nerves. The strongest risk factor in this patient is having several sexual partners at a very young age, which then puts her at risk of being infected with the human papilloma virus.

1: Having multiple sexual partners is the strongest risk factor for the development of cervical carcinoma. This is because having multiple sexual partners greatly increases the chance of being infected with the human papilloma virus. The 16 and 18 viral strain then triggers the carcinogenesis by inhibiting the tumor suppressor gene p53 and RB.

2: Although cigarette smoking will have an oncogenic effect, it is not the strongest risk factor here.

3: HIV is a risk factor for cervical carcinoma. However, it is a lesser risk factor than the human papilloma virus which is much more common.

4: Although the human papilloma virus does represent the strong risk factor, it does not cause the activation of oncogenes. Instead, it causes the inhibition of tumor suppressor genes.

5: Age in itself has not been reported to be a risk factor for the development of cervical carcinoma. An older person is more likely to develop cervical carcinoma if that person has for instance been exposed to the human papilloma virus, which then has more time to induce the process of carcinogenesis via the inhibition of tumor suppressor genes.

Acute intermittent porphyria is due to a defect in:

- ☐ ALA synthetase
- ☐ PPG oxidase
- ☐ Uroporphyrinogen decarboxylase
- ☐ Ferrochelatase
- ☐ Porphobilinogen deaminase

ALA synthetase	9%
PPG oxidase	3%
Uroporphyrinogen decarboxylase	31%
Ferrochelatase	3%
Porphobilinogen deaminase	53%

AIP - porphobilinogen de**A**minase; **PCT** - uroporphyrinogen de**C**arboxylase

Important for me Less important

A patient with glucose-6-phosphate dehydrogenase (G6PD) deficiency presents for advice about malaria prophylaxis. He is about to go on a 'gap year' during which he will be travelling abroad for 12 months. Which one of the following medications is it most important that he avoids?

☐ Artemether with lumefantrine

☐ Mefloquine

☐ Proguanil

☐ Doxycycline

☐ Primaquine

Artemether with lumefantrine

4%

Mefloquine

7%

Proguanil

4%

Doxycycline

4%

Primaquine

81%

Malaria prophylaxis (e.g. primaquine) can trigger haemolytic anaemia in those with G6PD deficiency

Important for me Less important

You are arranging a blood transfusion for a patient who has been admitted with an upper gastrointestinal haemorrhage as their haemoglobin is 59 g/l. They are concerned about the risks of contracting diseases from the transfusion and ask specifically about the risk of variant Creutzfeldt-Jakob Disease (vCJD) transmission. What is the most appropriate advice with respect to vCJD?

- ☐ There was never any risk of vCJD being transmitted via blood transfusion
- ☐ There had previously been a small risk of vCJD transmission but the risk has now been eliminated through screening
- ☐ Measures are taken to reduce the risk of vCJD transmission but there remains a very small risk of transmission
- ☐ There is a significant chance of vCJD transmission to patients who are between the ages of 40-60 years
- ☐ There is a significant chance of vCJD transmission to patients who are between the ages of 60-90 years

There was never any risk of vCJD being transmitted via blood transfusion

10%

There had previously been a small risk of vCJD transmission but the risk has now been eliminated through screening

22%

Measures are taken to reduce the risk of vCJD transmission but there remains a very small risk of transmission

59%

There is a significant chance of vCJD transmission to patients who are between the ages of 40-60 years

5%

There is a significant chance of vCJD transmission to patients who are between the ages of 60-90 years

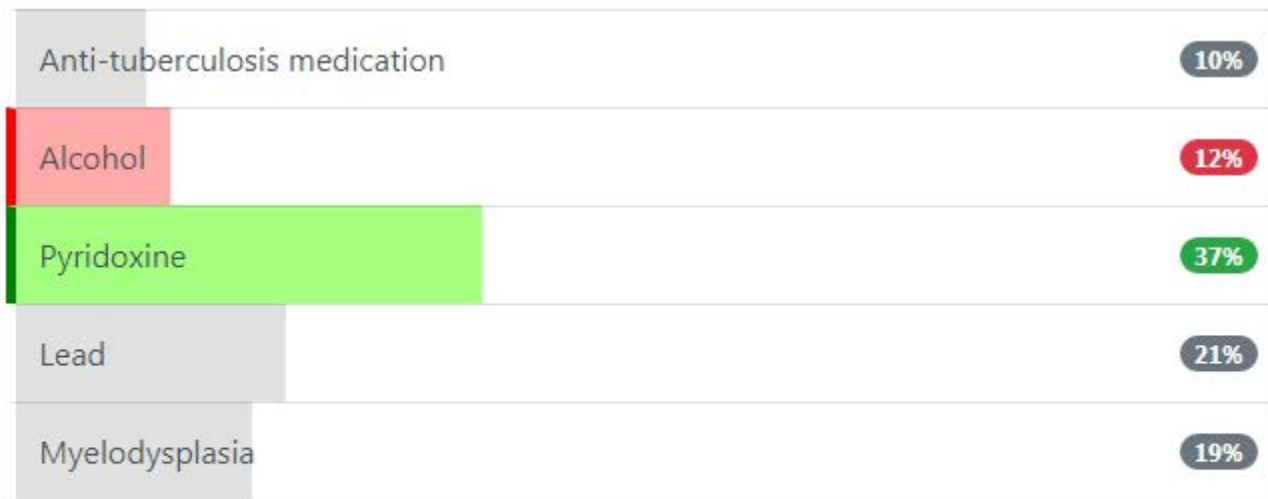
4%

A man is investigated for anaemia. A blood film is ordered and reported as follows:

Ring sideroblasts

Which one of the following is least likely to give this picture?

- ☐ Anti-tuberculosis medication
- ☐ Alcohol
- ☐ Pyridoxine
- ☐ Lead
- ☐ Myelodysplasia



Pyridoxine is actually a treatment for sideroblastic anaemia. Rarely pyridoxine deficiency may be the cause

Which one of the following is not a feature of paroxysmal nocturnal haemoglobinuria?

☐ Haemolytic anaemia

☐ Positive Ham test

☐ Haemoglobinuria

☐ Aplastic anaemia

☐ Haemarthrosis

Haemolytic anaemia

4%

Positive Ham test

6%

Haemoglobinuria

4%

Aplastic anaemia

18%

Haemarthrosis

68%

Dr Assem

A 50-year-old woman is investigated for weight loss and anaemia. She has no past medical history of note. Clinical examination reveals splenomegaly associated with pale conjunctivae. A full blood count is reported as follows:

Hb	10.9 g/dl
Platelets	$702 \times 10^9/l$
WCC	$56.6 \times 10^9/l$
Film	Leucocytosis noted. All stages of granulocyte maturation seen

Given the likely diagnosis, what is the most appropriate treatment?

- ☐ Chlorambucil
- ☐ Stem cell transplantation
- ☐ Rituximab
- ☐ Repeat full blood count in 3 months
- ☐ Imatinib

Chlorambucil

13%

Stem cell transplantation

8%

Rituximab

14%

Repeat full blood count in 3 months

8%

Imatinib

57%

A 68-year-old man who has small cell lung cancer is admitted onto the ward for chemotherapy. He has experienced severe nausea and vomiting due to the chemotherapy in the past. The consultant asks you to prescribe a neurokinin 1 (NK1) receptor blocker.

What agent will you choose?

- ☐ Aprepitant
- ☐ Dexamethasone
- ☐ Metoclopramide
- ☐ Domperidone
- ☐ Haloperidol

Aprepitant	63%
Dexamethasone	5%
Metoclopramide	12%
Domperidone	15%
Haloperidol	6%

Aprepitant is an anti-emetic which blocks the neurokinin 1 (NK1) receptor

Important for me Less important

Aprepitant is an anti-emetic which blocks the neurokinin 1 (NK1) receptor. It is a substance P antagonists (SPA). It is licensed for chemotherapy-induced nausea and vomiting (CINV) and for prevention of postoperative nausea and vomiting. It is also been shown to be effective in treating clinical depression.

Dexamethasone is a glucocorticoid. It is useful for preventing the delayed emesis phase of CINV.

Metoclopramide, domperidone, and haloperidol can all be used as anti-emetics due to their dopamine blocking effects.

A 48-year-old female who has just completed a course of chemotherapy complains of difficulty using her hands associated with 'pins and needles'. She has also experienced urinary hesitancy. Which cytotoxic drug is most likely to be responsible?

☐ Doxorubicin

☐ Cyclophosphamide

☐ Methotrexate

☐ Vincristine

☐ Bleomycin

Doxorubicin

6%

Cyclophosphamide

16%

Methotrexate

4%

Vincristine

69%

Bleomycin

5%

Vincristine - peripheral neuropathy

Important for me Less important

Vincristine is associated with peripheral neuropathy. Urinary hesitancy may develop secondary to bladder atony.

A 65-year-old man who is undergoing bone marrow transplant requires a blood transfusion. Irradiated packed red cells are requested. What is the purpose of requesting irradiated blood products in this situation?

- ☐ Depletes the packed cells of platelets reducing the risk of thrombotic complications
- ☐ Ensures the blood products are free of viruses and organisms
- ☐ Destroys HLA markers reducing the risk of blood transfusion reaction
- ☐ Reduces the HbA2/Hb ratio
- ☐ Depleted T-lymphocyte numbers reduce the risk of transfusion graft versus host disease

Depletes the packed cells of platelets reducing the risk of thrombotic complications

5%

Ensures the blood products are free of viruses and organisms

21%

Destroys HLA markers reducing the risk of blood transfusion reaction

21%

Reduces the HbA2/Hb ratio

3%

Depleted T-lymphocyte numbers reduce the risk of transfusion graft versus host disease

50%

Irradiated blood products are used as they are depleted in T-lymphocytes

Important for me Less important

The most common indications for irradiated blood products are conditions where the immune system is compromised.

What is the mechanism of action of DDAVP in von Willebrand's disease?

- ☐ Prevents renal excretion of von Willebrand's factor
- ☐ Induces release of factor VIII from endothelial cells
- ☐ Induces release of von Willebrand's factor from endothelial cells
- ☐ Inhibits breakdown of von Willebrand's factor
- ☐ Acts as substitute carrier molecule for factor VIII

Prevents renal excretion of von Willebrand's factor

7%

Induces release of factor VIII from endothelial cells

20%

Induces release of von Willebrand's factor from endothelial cells

48%

Inhibits breakdown of von Willebrand's factor

14%

Acts as substitute carrier molecule for factor VIII

12%

Desmopressin - induces release of von Willebrand's factor from endothelial cells

Important for me Less important

What is the main mechanism by which vitamin B12 is absorbed?

- ☐ Passive absorption in the terminal ileum
- ☐ Active absorption in the middle to terminal part of jejunum
- ☐ Active absorption by the parietal cells of the stomach
- ☐ Active absorption in the terminal ileum
- ☐ Passive absorption in the proximal ileum

Passive absorption in the terminal ileum

14%

Active absorption in the middle to terminal part of jejunum

4%

Active absorption by the parietal cells of the stomach

13%

Active absorption in the terminal ileum

64%

Passive absorption in the proximal ileum

4%

Vitamin B12 is actively absorbed in the terminal ileum

Important for me **Less important**

A small amount of vitamin B12 is passively absorbed without being bound to intrinsic factor.

Dr Assem

A 72-year-old man is admitted with a deep vein thrombosis. He is normally fit and well but has recently lost weight. Blood tests reveal the following:

IgG	889 mg/dl (range 600-1300 mg/dl)
IgM	1674 mg/dl (range 50-330 mg/dl)
IgA	131 mg/dl (range 60-300 mg/dl)

What is the most likely diagnosis?

- ☐ Monoclonal gammopathy of undetermined significance
- ☐ Acute promyelocytic leukaemia
- ☐ Waldenstrom's macroglobulinaemia
- ☐ Antiphospholipid syndrome
- ☐ Multiple myeloma

Monoclonal gammopathy of undetermined significance

17%

Acute promyelocytic leukaemia

3%

Waldenstrom's macroglobulinaemia

68%

Antiphospholipid syndrome

3%

Multiple myeloma

9%

IgM paraproteinaemia - ?Waldenstrom's macroglobulinaemia

Important for me [Less important](#)

Waldenstrom's macroglobulinaemia is more likely than monoclonal gammopathy of undetermined significance given the weight loss and deep vein thrombosis (evidence of hyperviscosity).

IgG and IgA and the most common type of immunoglobulins produced in myeloma.

You are asked to review a 60-year-old Greek man with known glucose-6-phosphate dehydrogenase (G6PD) deficiency who was admitted with malaria and a chest infection. He has developed jaundice and haemolytic anaemia after starting some medications this morning.

Which of these medications are most likely to have precipitated his crisis?

☐ Clarithromycin

☐ Amoxicillin

☐ Artesunate

☐ Primaquine

☐ Salbutamol

Clarithromycin	4%
Amoxicillin	4%
Artesunate	3%
Primaquine	87%
Salbutamol	2%

Malaria prophylaxis (e.g. primaquine) can trigger haemolytic anaemia in those with G6PD deficiency

Important for me Less important

Primaquine is a well known cause of haemolysis in G6PD deficiency and is used in the treatment of malaria. Artesunate is generally considered safe to use in G6PD deficiency. Penicillins and macrolides are safe antibiotics to use in G6PD deficiency.

Source: BNF

Dr Assem

A 54-year-old man is investigated for recurrent episodes of abdominal pain associated with weakness of his arms and legs. Which one of the following urine tests would best indicate lead toxicity?

- ☐ Haemoglobinuria
- ☐ Coproporphyrin
- ☐ Porphobilinogen
- ☐ Uroporphyrin
- ☐ Ham's test

Haemoglobinuria

6%

Coproporphyrin

39%

Porphobilinogen

26%

Uroporphyrin

18%

Ham's test

11%

A 74-year-old male is seen on the acute medical ward with a history of persistent frontal headaches associated with blurred vision for the past week. On further questioning, the patient reports a history of worsening fatigue and shortness of breath over the preceding 2 months.

The results of preliminary investigations are as follows:

Hb	98 g/l
Platelets	$100 \times 10^9/l$
WBC	$6 \times 10^9/l$
Erythrocyte Sedimentation Rate	50mm/hr

On examination you note that the patient has enlarged cervical lymph nodes and palpable splenomegaly.

Which of the following conditions is most likely to be the cause of the patient's symptoms?

- ☐ Hodgkin's lymphoma
- ☐ Multiple myeloma
- ☐ Acute myeloid leukaemia
- ☐ Waldenstrom's macroglobulinaemia
- ☐ Acute lymphoblastic leukaemia

Submit answer

Dr Assem

Hodgkin's lymphoma	23%
Multiple myeloma	7%
Acute myeloid leukaemia	13%
Waldenstrom's macroglobulinaemia	48%
Acute lymphoblastic leukaemia	8%

Patients with Waldenstrom's macroglobulinaemia often present with issues secondary to hyperviscosity

Important for me Less important

Waldenstrom's macroglobulinaemia is a form of lymphoplasmacytoid lymphoma (LPL), characterised by a monoclonal IgM paraproteinaemia. This paraproteinaemia leads to systemic symptoms of hyperviscosity such as headaches, visual disturbances and in rarer cases, strokes and ischaemic organ damage.

Many patients often present with issues secondary to this hyperviscosity, as well as the more generalised systemic symptoms and signs common to many haematological diseases.

- 1) Hodgkin's lymphoma, although likely to cause cervical lymphadenopathy and splenomegaly, is not usually associated with thrombocytopaenia or issues secondary to hyperviscosity
- 2) Multiple myeloma often causes bony pain in areas of lesions and isn't often associated with lymphadenopathy or organomegaly
- 3) AML doesn't usually cause lymphadenopathy or splenomegaly.
- 5) ALL is less common in adults, and although capable of causing lymphadenopathy and splenomegaly, would not usually be associated with symptoms of hyperviscosity

A 54-year-old man is diagnosed as having acute myeloid leukaemia. What is the single most important test in determining his prognosis?

- ☐ Gene-expression profiling
- ☐ White cell count at diagnosis
- ☐ Immunophenotyping
- ☐ Lactate dehydrogenase
- ☐ Cytogenetics

Gene-expression profiling

9%

White cell count at diagnosis

9%

Immunophenotyping

37%

Lactate dehydrogenase

4%

Cytogenetics

41%

All of the above may be important but chromosomal abnormalities detected by cytogenetics are the single most important prognostic factor.

What is the most useful marker of prognosis in myeloma?

- ☐ Calcium level
- ☐ Urine Bence-Jones protein levels
- ☐ Alkaline phosphatase
- ☐ ESR
- ☐ B2-microglobulin

Calcium level

19%

Urine Bence-Jones protein levels

15%

Alkaline phosphatase

8%

ESR

6%

B2-microglobulin

52%

Which one of the following is associated with a high leucocyte alkaline phosphatase score?

- ☐ Myelofibrosis
- ☐ Pernicious anaemia
- ☐ Infectious mononucleosis
- ☐ Paroxysmal nocturnal haemoglobinuria
- ☐ Chronic myeloid leukaemia

Myelofibrosis

48%

Pernicious anaemia

5%

Infectious mononucleosis

12%

Paroxysmal nocturnal haemoglobinuria

13%

Chronic myeloid leukaemia

21%

A 45-year-old woman attends the acute medical unit with her second DVT this year. Her background is notable for COPD, hypertension and chronic kidney disease stage 4 secondary to membranous glomerulonephritis.

In chronic kidney disease, which of the following contributes most to the increased risk of VTE?

- ☐ Immobility
- ☐ Loss of protein C
- ☐ Loss of antithrombin III
- ☐ Concurrent cancer
- ☐ Lupus anticoagulant

Immobility	5%
Loss of protein C	25%
Loss of antithrombin III	58%
Concurrent cancer	4%
Lupus anticoagulant	8%

CKD is the most common cause of antithrombin III deficiency

Important for me Less important

Antithrombin III is an important regulatory molecule that reduces the activity of the intrinsic pathway of the clotting cascade. Loss of antithrombin III, thus, increases coagulability.

Whilst there are hereditary causes of antithrombin III, it is a particularly small protein and is easily lost through the nephron in CKD.

CKD does also increase the risk of concurrent cancers, but not as significantly as the protein loss. Lupus anticoagulant is indeed highly prothrombotic and is associated with antiphospholipid syndrome.

A 28-year-old man is investigated for cervical lymphadenopathy. A biopsy shows nodular sclerosing Hodgkin's lymphoma. Which one of the following factors is associated with a poor prognosis?

- ☐ History of Epstein Barr virus infection
- ☐ Mediastinal involvement
- ☐ Female sex
- ☐ Night sweats
- ☐ Lymphocytes 20% of total white blood cells

History of Epstein Barr virus infection

7%

Mediastinal involvement

15%

Female sex

5%

Night sweats

58%

Lymphocytes 20% of total white blood cells

16%

Night sweats are a 'B' symptom and imply a poor prognosis

Dr Assef

A 72-year-old man with metastatic small cell lung cancer is admitted to the local hospice for symptom control. His main problem at the moment is intractable hiccups. What is the most appropriate management?

☐ Chlorpromazine

☐ Codeine phosphate

☐ Diazepam

☐ Methadone

☐ Phenytoin

Chlorpromazine

68%

Codeine phosphate

10%

Diazepam

13%

Methadone

6%

Phenytoin

3%

Hiccups in palliative care - chlorpromazine or haloperidol

Important for me Less important

Haloperidol may also be used

Dr Assem

A 64-year-old woman with metastatic breast cancer is brought in by her husband. Over the past two days she has developed increasingly severe back pain. Her husband reports that her legs are weak and she is having difficulty walking. On examination she has reduced power in both legs and increased tone associated with brisk knee and ankle reflexes. There is some sensory loss in the lower limbs and feet but perianal sensation is normal. What is the most likely diagnosis?

- ☐ Spinal cord compression at T10
- ☐ Cauda equina syndrome
- ☐ Guillain Barre syndrome
- ☐ Hypercalcaemia
- ☐ Paraneoplastic peripheral neuropathy



The upper motor neuron signs point towards a diagnosis of spinal cord compression above L1, rather than cauda equina syndrome.

A 30-year-old man is investigated for enlarged, painless cervical lymph nodes. A biopsy is taken and a diagnosis of Hodgkin's lymphoma is made. Which one of the following types of Hodgkin's lymphoma carries the best prognosis?

☐ Lymphocyte predominant

☐ Mixed cellularity

☐ Nodular sclerosing

☐ Hairy cell

☐ Lymphocyte depleted

Lymphocyte predominant

63%

Mixed cellularity

5%

Nodular sclerosing

21%

Hairy cell

5%

Lymphocyte depleted

7%

Hodgkin's lymphoma - best prognosis = lymphocyte predominant

Important for me

Less important

Which one of the following malignancies may be associated with HTLV-1?

- ☐ Adult T-cell leukaemia
- ☐ Colorectal cancer
- ☐ Burkitt's lymphoma
- ☐ Medullary thyroid cancer
- ☐ Breast cancer

Adult T-cell leukaemia

73%

Colorectal cancer

4%

Burkitt's lymphoma

14%

Medullary thyroid cancer

6%

Breast cancer

3%

Each one of the following is associated with hyposplenism, except:

- ☐ Sickle-cell anaemia
- ☐ Liver cirrhosis
- ☐ Systemic lupus erythematosus
- ☐ Coeliac disease
- ☐ Splenectomy

Sickle-cell anaemia

17%

Liver cirrhosis

47%

Systemic lupus erythematosus

19%

Coeliac disease

12%

Splenectomy

5%

A 65-year-old man comes for review. He has a history of small cell lung cancer and ischaemic heart disease. His cancer was diagnosed five months ago and he has recently completed a course of chemotherapy. From a cardiac point of view he had a myocardial infarction two years ago following which he had primary angioplasty with stent placement. He has had no angina since.

For the past week he has become increasingly short-of-breath. This is worse at night and is associated with an occasional non-productive cough. He has also noticed that his wedding ring feels tight. Clinical examination of his chest is unremarkable. He does however have distended neck veins and periorbital oedema. What is the most likely diagnosis?

- ☐ Heart failure secondary to chemotherapy
- ☐ Tumour lysis syndrome
- ☐ Nephrotic syndrome secondary to chemotherapy
- ☐ Superior vena cava obstruction
- ☐ Hypercalcaemia

Heart failure secondary to chemotherapy

11%

Tumour lysis syndrome

4%

Nephrotic syndrome secondary to chemotherapy

5%

Superior vena cava obstruction

78%

Hypercalcaemia

2%

A 22-year-old man with sickle cell anaemia presents with pallor, lethargy and a headache. Blood results are as follows:

Hb	4.6 g/dl
Reticulocytes	3%

Infection with a parvovirus is suspected. What is the likely diagnosis?

- ☐ Thrombotic crisis
- ☐ Sequestration crisis
- ☐ Transformation to myelodysplasia
- ☐ Haemolytic crisis
- ☐ Aplastic crisis



The sudden fall in haemoglobin without an appropriate reticulocytosis (3% is just above the normal range) is typical of an aplastic crisis, usually secondary to parvovirus infection

Which one of the following features is characteristic of acute intermittent porphyria?

- ☐ Photosensitivity
- ☐ Increased urinary porphobilinogen between acute attacks
- ☐ Hyponatraemia during attacks
- ☐ Autosomal recessive inheritance
- ☐ Increased faecal protoporphyrin excretion

Photosensitivity

21%

Increased urinary porphobilinogen between acute attacks

54%

Hypernatraemia during attacks

4%

Autosomal recessive inheritance

13%

Increased faecal protoporphyrin excretion

7%

Dr Assef

In idiopathic thrombocytopenic purpura what are the autoantibodies most commonly directed at?

- ☐ Platelet activating factor
- ☐ Glycoprotein IIb/IIIa complex
- ☐ ATP receptor
- ☐ Anti-thrombin III receptor
- ☐ ADP receptor

Platelet activating factor

17%

Glycoprotein IIb/IIIa complex

59%

ATP receptor

4%

Anti-thrombin III receptor

9%

ADP receptor

11%

A 23-year-old woman presents with lethargy. The following blood results are obtained:

Hb	10.4 g/dl
Plt	$278 \times 10^9/l$
WCC	$6.3 \times 10^9/l$
MCV	68 fl
Blood film	Microcytic hypochromic RBCs, marked anisocytosis and basophilic stippling noted
HbA2	3.9%

What is the most likely diagnosis?

- ☐ Lead poisoning
- ☐ Sickle cell anaemia
- ☐ Beta-thalassaemia trait
- ☐ Hereditary spherocytosis
- ☐ Sideroblastic anaemia

Lead poisoning

33%

Sickle cell anaemia

5%

Beta-thalassaemia trait

42%

Hereditary spherocytosis

6%

Sideroblastic anaemia

14%

Disproportionate microcytic anaemia - think beta-thalassaemia trait

Important for me Less important

A microcytic anaemia in a female should raise the possibility of either gastrointestinal blood loss or menorrhagia. However, there is no history to suggest this and the microcytosis is disproportionately low for the haemoglobin level. This combined with a raised HbA2 points to a diagnosis of beta-thalassaemia trait.

Basophilic stippling is also seen in lead poisoning but would not explain the raised HbA2 levels.

Dr. Arsem

A 17-year-old man is investigated after he bled excessively following a tooth extraction. The following results are obtained:

Plt	$173 \times 10^9/l$
PT	12.9 secs
APTT	84 secs

Which clotting factor is he most likely to be deficient in?

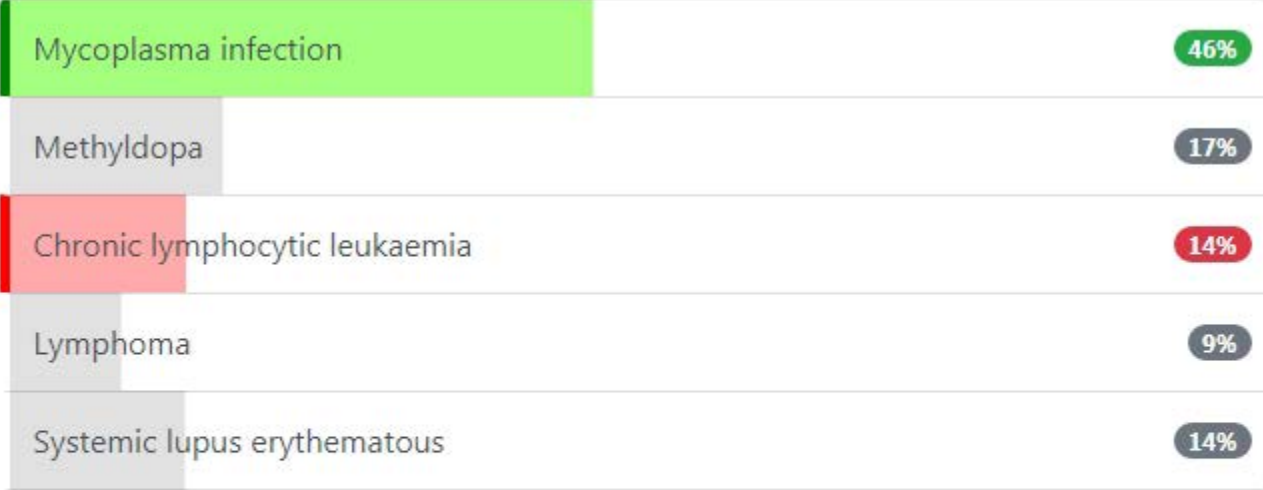
- ☐ Factor VI
- ☐ Factor VII
- ☐ Factor VIII
- ☐ Factor IX
- ☐ Factor X



This man is most likely to have haemophilia A, which accounts for 90% of cases of haemophilia.

Which one of the following is least likely to cause a warm autoimmune haemolytic anaemia?

- ☐ Mycoplasma infection
- ☐ Methyldopa
- ☐ Chronic lymphocytic leukaemia
- ☐ Lymphoma
- ☐ Systemic lupus erythematosus



Condition	Percentage
Mycoplasma infection	46%
Methyldopa	17%
Chronic lymphocytic leukaemia	14%
Lymphoma	9%
Systemic lupus erythematosus	14%

Mycoplasma infection

46%

Methyldopa

17%

Chronic lymphocytic leukaemia

14%

Lymphoma

9%

Systemic lupus erythematosus

14%

Mycoplasma infection causes a cold autoimmune haemolytic anaemia. Systemic lupus erythematosus can rarely be associated with a mixed-type autoimmune haemolytic anaemia

Dr Assem

A 62-year-old woman who is known to have metastatic breast cancer presents with increasing shortness of breath. She is currently receiving a chemotherapy regime. On examination she has a third heart sound and the apex beat is displaced to the 6th intercostal space, anterior axillary line. Which one of the following chemotherapeutic agents is most likely to be responsible?

Paclitaxel

4%

Docetaxel

6%

Bleomycin

10%

Dactinomycin

3%

Doxorubicin

76%

Paclitaxel

4%

Docetaxel

6%

Bleomycin

10%

Dactinomycin

3%

Doxorubicin

76%

Doxorubicin may cause cardiomyopathy

Important for me

Less important

A 52-year-old is found to have chronic myeloid leukaemia following investigation for splenomegaly. Which one of the following best describes the function of the BCR-ABL fusion protein?

- ☐ Epidermal growth factor receptor
- ☐ Phospholipase C
- ☐ CD52 co-receptor
- ☐ Tyrosine kinase
- ☐ Fibroblast growth factor receptor

Epidermal growth factor receptor

7%

Phospholipase C

2%

CD52 co-receptor

4%

Tyrosine kinase

80%

Fibroblast growth factor receptor

6%

Chronic myeloid leukaemia - imatinib = tyrosine kinase inhibitor

Important for me

Less important

Dr Assem

A 49-year-old female is admitted to hospital due to shortness of breath and pleuritic chest pain. She also complains of a marked decrease in appetite for the past 4 months. An admission chest x-ray shows a right-sided pleural effusion. An underlying malignancy is suspected and a series of tumour markers are requested:

CA 19-9	55 u/ml (< 40)
CA 125	654 u/ml (< 30)
CA 15-3	9 u/ml (<40)

What is the most likely underlying diagnosis?

- ☐ Ovarian fibroma
- ☐ Small cell lung cancer
- ☐ Pancreatic carcinoma
- ☐ Hepatocellular cancer
- ☐ Breast carcinoma

Ovarian fibroma

70%

Small cell lung cancer

4%

Pancreatic carcinoma

15%

Hepatocellular cancer

3%

Breast carcinoma

8%

This patient has Meig's syndrome - an ovarian fibroma associated with a pleural effusion and ascites

Which one of the following cytotoxic agents acts by inhibiting dihydrofolate reductase and thymidylate synthesis?

☐ Methotrexate

☐ Vincristine

☐ Bleomycin

☐ Cyclophosphamide

☐ Doxorubicin

Methotrexate

80%

Vincristine

4%

Bleomycin

5%

Cyclophosphamide

7%

Doxorubicin

4%

Methotrexate - inhibits dihydrofolate reductase and thymidylate synthesis

Important for me Less important

A 32-year-old female is noted to have a mild microcytic anaemia on routine blood tests. She is otherwise well with no major past medical history. She is originally from Turkey. You suspect that she might have a haemoglobin abnormality. Which of the following blood results is most likely to be elevated above the normal range?

☐ Total haemoglobin

☐ Haemoglobin A2

☐ Haemoglobin H

☐ Haptoglobin

☐ White cell count

Total haemoglobin	4%
Haemoglobin A2	63%
Haemoglobin H	15%
Haptoglobin	16%
White cell count	2%

HbA2 is raised in patients with beta thalassaemia major

Important for me Less important

The correct answer is HbA2. This patient is most likely to have beta thalassaemia minor. She has no symptoms of disease other than a mild asymptomatic anaemia and is from an area of higher prevalence for this genetic condition. HbA2 levels are elevated in beta thalassaemia major and minor. It is a variant of haemoglobin A with two delta chains replacing the normal two beta chains. It is found in small amounts in healthy adults at around 1.5 – 3% of total haemoglobin. It is increased in beta thalassaemia because of reduced production of haemoglobin beta chains.

Total haemoglobin would be reduced because of low level haemolysis, leading to a mild anaemia. Haptoglobin would be normal or mildly reduced, as it binds to free haemoglobin released from erythrocytes after haemolysis. Haemoglobin H is found in severe alpha thalassaemia and consists of four beta chains. The white cell count would not be affected in thalassaemia.

Beta thalassaemia. Genetics home reference

<https://ghr.nlm.nih.gov/condition/beta-thalassemia>

A 56 year old man is treated with doxorubicin for transition cell carcinoma of the bladder. Which one of the following adverse effects is most characteristically associated with this drug?

- ☐ Ototoxicity
- ☐ Pulmonary fibrosis
- ☐ Peripheral neuropathy
- ☐ Cardiomyopathy
- ☐ Haemorrhagic cystitis

Ototoxicity

4%

Pulmonary fibrosis

10%

Peripheral neuropathy

9%

Cardiomyopathy

68%

Haemorrhagic cystitis

8%

Doxorubicin may cause cardiomyopathy

Important for me

Less important

A 54-year-old man presents to his GP with a one-month history of fever, malaise and weight loss. He also complains of abdominal fullness and early satiety. His past medical history and travel history is unremarkable and he is not on any regular medications. On examination, the GP detects splenomegaly.

The results of his full blood count and white cell differential are presented below:

Hb	123 g/l	(130-180 g/l)
MCV	85.6 fL	(80-100 fL)
Platelets	420 * 10 ⁹ /l	(140-400 * 10 ⁹ /l)
WBC	102 * 10 ⁹ /l	(4-11 * 10 ⁹ /l)
Neutrophils	51.0 %	(50-70%)
Bands	23.0 %	(0-4%)
Lymphocytes	2.0 %	(20-40%)
Monocytes	2.0 %	(2-8%)
Eosinophils	1.0 %	(0-5%)
Basophils	3.0 %	(0-2%)

What is the most likely diagnosis?

- ☐ Acute myeloid leukaemia
- ☐ Acute lymphocytic leukaemia
- ☐ Chronic myeloid leukaemia
- ☐ Chronic lymphocytic leukaemia
- ☐ Essential thrombocytosis

Acute myeloid leukaemia	26%
Acute lymphocytic leukaemia	9%
Chronic myeloid leukaemia	45%
Chronic lymphocytic leukaemia	13%
Essential thrombocytosis	6%

In chronic myeloid leukaemia there is an increase in granulocytes at different stages of maturation +/- thrombocytosis

Important for me Less important

Acute myeloid leukaemia - blood tests will reveal immature blood cells (blasts).

Acute lymphocytic leukaemia - far more common in children and blood tests will reveal immature blasts.

Chronic lymphocytic leukaemia - a malignancy of the lymphoid lineage so there will be a raised lymphocyte count.

Essential thrombocytosis - although patients with essential thrombocytosis can have a raised white cell count, these patients tend to have much higher platelet counts (typically $>450 \times 10^9/l$).

The white cell differential in this case demonstrates granulocytes at different stages of maturation (immature band forms and mature neutrophils) which is suggestive of chronic myeloid leukaemia. The platelet count may also be raised in these patients.

Which one of the following is least recognised as a treatment modality in idiopathic thrombocytopenic purpura?

- ☐ Plasma exchange
- ☐ Splenectomy
- ☐ IV immunoglobulin
- ☐ Cyclophosphamide
- ☐ Oral prednisolone

Plasma exchange

42%

Splenectomy

18%

IV immunoglobulin

9%

Cyclophosphamide

23%

Oral prednisolone

9%

Which one of the following is least associated with thymomas?

- ☐ Syndrome inappropriate ADH
- ☐ Myasthenia gravis
- ☐ Red cell aplasia
- ☐ Dermatomyositis
- ☐ Motor neurone disease

Syndrome inappropriate ADH

23%

Myasthenia gravis

6%

Red cell aplasia

9%

Dermatomyositis

10%

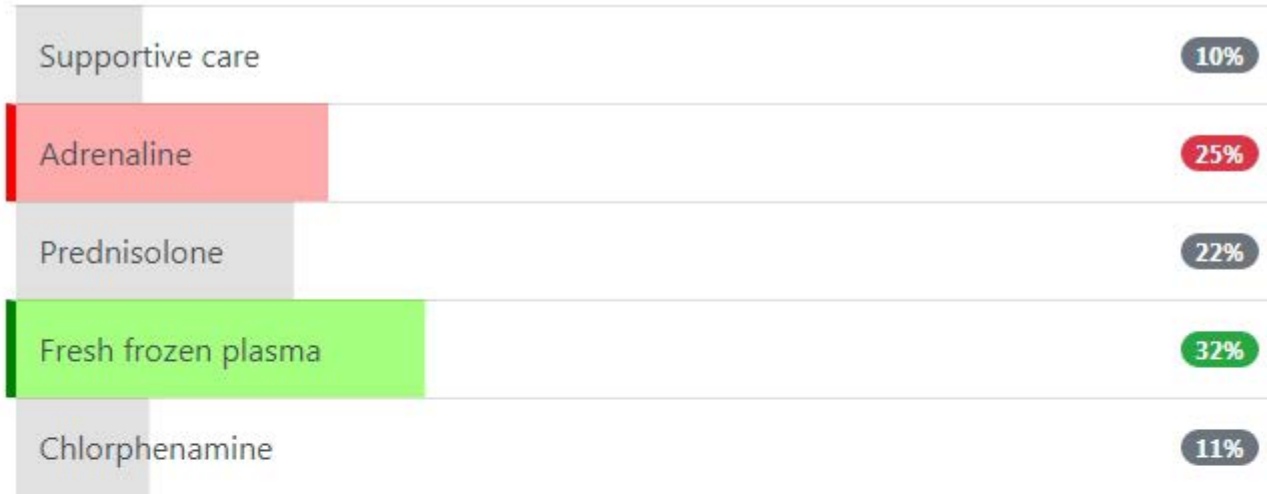
Motor neurone disease

51%

A 30 year-old man presents with recurrent abdominal pain. This is not associated with food, heartburn, indigestion or dysphagia. He has had no weight loss. His blood tests have been normal and he has been given a diagnosis of irritable bowel syndrome. Despite lifestyle modifications and laxatives, he has still had recurrent pain. He then presents with swelling of his lips and tongue. This is not itchy and he is systemically well, but does have a stridor.

What would be the most successful management out of the following options?

- ☐ Supportive care
- ☐ Adrenaline
- ☐ Prednisolone
- ☐ Fresh frozen plasma
- ☐ Chlorphenamine



This patient has a history and acute presentation in keeping with hereditary angioedema. This is caused by a deficiency of C1-esterase inhibitor. It is normally treated with C1-INH concentrate, however when this is unavailable, fresh frozen plasma is the next best treatment. The lack of itching in this case and the fact that he is systemically well point away from anaphylaxis as a cause. Hereditary angioedema rarely responds to treatment with adrenaline or antihistamines. In a real life situation this patient would probably be treated as anaphylaxis, but the question asks what the most successful treatment would be, and in this case it would be FFP.

Which one of the following causes of primary immunodeficiency is due to a defect in both B-cell and T-cell function?

- ☐ Di George syndrome
- ☐ Chronic granulomatous disease
- ☐ Bruton's congenital agammaglobulinaemia
- ☐ Leukocyte adhesion deficiency
- ☐ Ataxic telangiectasia

Which one of the following causes of primary immunodeficiency is due to a defect in both B-cell and T-cell function?

Di George syndrome

18%

Chronic granulomatous disease

12%

Bruton's congenital agammaglobulinaemia

13%

Leukocyte adhesion deficiency

8%

Ataxic telangiectasia

49%

Combined B- and T-cell disorders: SCID WAS ataxic (SCID, Wiskott-Aldrich syndrome, ataxic telangiectasia)

Important for me Less important

A 34-year-old intravenous drug user is admitted with a purpuric rash affecting her legs. Blood tests reveal the following:

Hb	11.4g/dl
Platelets	$489 \times 10^9/l$
WCC	$12.3 \times 10^9/l$
HCV PCR	positive
HBsAg	negative
Rheumatoid factor	positive
C3/C4	reduced

What is the most likely diagnosis?

- ☐ Polyarteritis nodosa
- ☐ Henoch-Schonlein purpura
- ☐ Wegener's granulomatosis
- ☐ Cryoglobulinaemia
- ☐ Systemic lupus erythematosus

Polyarteritis nodosa

12%

Henoch-Schonlein purpura

12%

Wegener's granulomatosis

6%

Cryoglobulinaemia

62%

Systemic lupus erythematosus

9%

Hepatitis C infection is associated with type II (mixed) cryoglobulinaemia, suggested by the purpuric rash, positive rheumatoid factor and reduced complement levels

Burkitt's lymphoma is associated with which one of the following genetic changes:

- ☐ Cyclin D1-IGH gene translocation
- ☐ TEL-JAK2 gene translocation
- ☐ Bcl-2 gene translocation
- ☐ C-myc gene translocation
- ☐ BCR-Abl1 gene translocation

Cyclin D1-IGH gene translocation

4%

TEL-JAK2 gene translocation

3%

Bcl-2 gene translocation

8%

C-myc gene translocation

78%

BCR-Abl1 gene translocation

8%

Burkitt's lymphoma - c-myc gene translocation

Important for me

Less important

Chronic lymphocytic leukaemia is mostly due to a:

- ☐ Polyclonal proliferation of B-cell lymphocytes
- ☐ Monoclonal proliferation of B-cell lymphocytes
- ☐ Monoclonal proliferation of large granular lymphocytes
- ☐ Monoclonal proliferation of T-cell lymphocytes
- ☐ Polyclonal proliferation of T-cell lymphocytes

Polyclonal proliferation of B-cell lymphocytes

17%

Monoclonal proliferation of B-cell lymphocytes

60%

Monoclonal proliferation of large granular lymphocytes

6%

Monoclonal proliferation of T-cell lymphocytes

11%

Polyclonal proliferation of T-cell lymphocytes

6%

CLL is caused by a monoclonal proliferation of B-cell lymphocytes

Important for me

Less important

A 25-year-old woman with primary antiphospholipid syndrome is reviewed. She has just had a booking ultrasound at 11 weeks gestation which confirms a viable pregnancy. This is her first pregnancy and she is otherwise fit and well. Which one of the following is the recommend treatment?

- ☐ Aspirin + prednisolone
- ☐ Low-molecular weight heparin
- ☐ Prednisolone + low-molecular weight heparin
- ☐ Aspirin + low-molecular weight heparin
- ☐ Aspirin

Aspirin + prednisolone

4%

Low-molecular weight heparin

20%

Prednisolone + low-molecular weight heparin

4%

Aspirin + low-molecular weight heparin

42%

Aspirin

30%

Antiphospholipid syndrome in pregnancy: aspirin + LMWH

Important for me Less important

The ultrasound at 11 weeks gestation would show a fetal heart if the pregnancy was viable. This patient should therefore be taking both aspirin and low-molecular weight heparin.

Dr Assem

A 15-year-old girl is referred to haematology. She started having periods three years ago which have always been heavy and prolonged. Unfortunately the menorrhagia has responded poorly to trials of tranexamic acid and the combined oral contraceptive pill. Blood tests show the following:

Hb	10.3 g/dl
Plt	239 * 10 ⁹ /l
WBC	6.5 * 10 ⁹ /l
PT	12.9 secs
APTT	37 secs

What is the most likely diagnosis?

- ☐ Haemophilia B
- ☐ Disseminated intravascular coagulation
- ☐ Haemophilia A
- ☐ Idiopathic thrombocytopenic purpura
- ☐ Von Willebrand's disease

Dr Assem

Haemophilia B	8%
Disseminated intravascular coagulation	2%
Haemophilia A	13%
Idiopathic thrombocytopenic purpura	5%
Von Willebrand's disease	72%

Von Willebrand's disease is the most likely diagnosis as it is the most common inherited bleeding disorder. The mildly elevated APTT is consistent with this diagnosis.

The mild anaemia is consistent with the long history of menorrhagia.

An 80-year-old man has spent his whole working life as a loft insulator and is concerned that he may have been exposed to asbestos. He has been informed of the risk of mesothelioma but wants to know if there are any other conditions for which he is at higher risk than the general population. Which of the following is also proven to have a causal link with asbestos exposure?

- ☐ Bronchiectasis
- ☐ Type II diabetes
- ☐ Bronchial carcinoma
- ☐ Basal cell carcinoma of the skin
- ☐ Ischaemic heart disease

Bronchiectasis	18%
Type II diabetes	3%
Bronchial carcinoma	62%
Basal cell carcinoma of the skin	14%
Ischaemic heart disease	4%

Exposure to asbestos is a risk factor for bronchial carcinoma as well as mesothelioma

Important for me Less important

Answer 3 is correct. Asbestos is well known to increase the risk of mesothelioma, but also increases the risk of bronchial carcinoma, laryngeal cancer and ovarian cancer. There is also some limited evidence that asbestos may increase the risk of cancer of the stomach, pharynx and bowel.

Exposure to asbestos also increases the risk of some benign diseases, including pleural plaques, diffuse pleural thickening, asbestos related benign pleural effusions and asbestosis.

BMJ Clinical Review:

<http://www.bmj.com/content/339/bmj.b3209.full>

National Cancer Institute:

<https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/asbestos/asbestos-fact-sheet#q3>

A 29-year-old man presented to the hospital after he had two episodes of bright red urine in the morning. He is very worried and tells the attending doctor that he has never had such an episode before. He has just started working at an engineering firm and is planning to get married in a few months. He reports feeling tired for the past few months but thought this was due to his job which required him to travel to construction sites every day. He has no significant family history. He had an appendectomy when he was a child but other than that he has never been admitted to the hospital. A blood test reveals a hemoglobin concentration of 11.5 g/dL and a reticulocyte of 14% of red blood cells. Which of the findings is the most likely to be reported upon flow cytometry of a blood sample from this patient?

- ☐ C3 negative cells
- ☐ CD55 negative cells
- ☐ CD59 negative cells
- ☐ C5 to C9 negative cells
- ☐ CD55 and CD59 negative cells

C3 negative cells	6%
CD55 negative cells	10%
CD59 negative cells	12%
C5 to C9 negative cells	11%
CD55 and CD59 negative cells	62%

This patient presented with the signs and symptoms consistent with a diagnosis of paroxysmal nocturnal hemoglobinuria (PNH). This condition is an acquired and chronic form of intrinsic hemolytic anemia. Patients can present with hematuria, or even simply symptoms of anemia. Venous thrombosis is also a common occurrence. The classic triad is hemolytic anemia, pancytopenia, and venous thrombosis. Flow cytometry is the gold standard laboratory investigations and shows CD55 and CD59 negative red and blood cells.

- 1: A deficiency of C3 is a complement deficiency disorder. Since C3 plays an important role in the activation of both the classical and alternative complement pathways, a C3 deficiency confers a higher risk of acquiring recurrent bacterial infections.
- 2: It is true that this will be present in this patient's cells. However, PNH patients will also have a deficiency of CD59.
- 3: It is true that this will be present in this patients' cells. However, PNH patients will also have a deficiency of CD55.
- 4: This would indicate terminal complement deficiency. This condition involves a deficiency of the complements forming the membrane attack membrane. C5 to C9 deficiency confers a high risk of infection with *Neisseria* organisms.
- 5: The gold standard in the diagnosis of PNH is flow cytometry, and patients usually have a deficiency of both CD55 and CD59 on their red as well as their white blood cells. Eculizumab is a humanized monoclonal antibody which has been approved for the treatment of PNH. It works mainly via the inhibition of the terminal complement cascade.

A 49-year-old woman is referred to the haematology clinic with easy bruising and recurrent epistaxis. She is otherwise well. Blood tests reveal the following:

Hb	12.9 g/dl
Platelets	$19 \times 10^9/l$
WCC	$6.6 \times 10^9/l$

The patient refuses consent for a bone marrow examination. What is the most appropriate initial management?

☐ Platelet transfusion

☐ Oral prednisolone

☐ No treatment

☐ ABVD chemotherapy

☐ Splenectomy

Platelet transfusion

26%

Oral prednisolone

57%

No treatment

9%

ABVD chemotherapy

3%

Splenectomy

4%

ITP - give oral prednisolone

Important for me Less important

The likely diagnosis in this patient is idiopathic thrombocytopenic purpura. The first line treatment in such patients is high-dose prednisolone. Bone marrow examination would demonstrate increased megakaryocytes

A 52-year-old female patient presents to the oncology clinic with an 8-months history of poor appetite and weight loss. She also complains of a right upper quadrant discomfort which has been present for the last 3 months. An ultrasound scan reveals multiple lesions in the liver suggestive of liver metastasis. A tumour marker profile reveals a raised level of CA 15-3.

What is the most likely primary tumour?

- ☐ Colorectal carcinoma
- ☐ Small cell lung carcinoma
- ☐ Breast carcinoma
- ☐ Ovarian carcinoma
- ☐ endometrial carcinoma

Colorectal carcinoma

8%

Small cell lung carcinoma

5%

Breast carcinoma

65%

Ovarian carcinoma

15%

endometrial carcinoma

7%

CA 15-3 is a tumour marker in breast cancers

Important for me ~~Less important~~

CA 15-3 is a tumour marker in breast cancers.

Bombesin is a tumour marker in small cell lung cancers.

Carcinoembryonic antigen (CEA) is a tumour marker in colorectal cancers.

CA 125 is a tumour marker in ovarian cancers and also endometrial cancers.

Dr Assem

Which of the following is most associated with thymomas?

- ☐ Myelodysplasia
- ☐ Thrombocytopenia
- ☐ Acute myeloid leukaemia
- ☐ Acute lymphoblastic leukaemia
- ☐ Red cell aplasia

Myelodysplasia

12%

Thrombocytopenia

5%

Acute myeloid leukaemia

10%

Acute lymphoblastic leukaemia

16%

Red cell aplasia

57%

Dr. Assam

A 72-year-old man with metastatic colon cancer is reviewed. He currently takes co-codamol 30/500 2 tablets qds for pain relief. Unfortunately this is not controlling his pain. What is the most appropriate change to his medication?

- ☐ Switch to MST 15mg bd + paracetamol 1g qds
- ☐ Switch to MST 35mg bd + paracetamol 1g qds
- ☐ Add tramadol 50-100mg 1-2 qds
- ☐ Switch to MST 25mg bd
- ☐ Switch to MST 15mg bd

Switch to MST 15mg bd + paracetamol 1g qds

46%

Switch to MST 35mg bd + paracetamol 1g qds

15%

Add tramadol 50-100mg 1-2 qds

13%

Switch to MST 25mg bd

12%

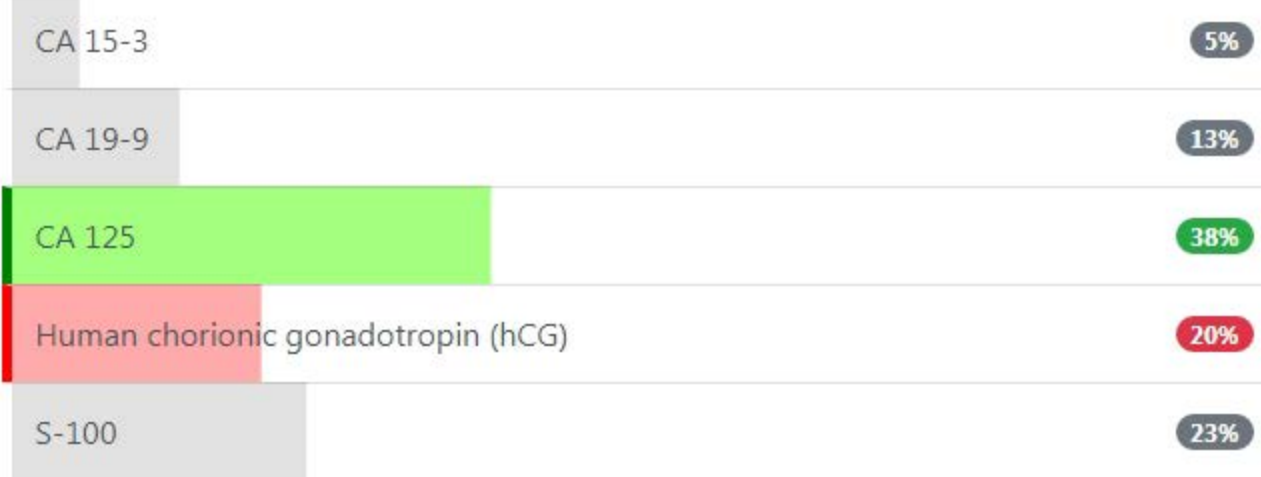
Switch to MST 15mg bd

14%

His total codeine dose is $30 \times 2 \times 4 = 240$ mg/day. Converting this to oral morphine = 24 mg/day. It is therefore reasonable to start MST 15mg bd as his pain is not currently controlled. Paracetamol should be continued as it has been shown to give benefits even to patients on large doses of morphine

A 54-year-old woman is reviewed in oncology clinic following debulking surgery for primary peritoneal cancer. She is known to have two liver metastases. She underwent surgery one month ago and has come in for review prior to adjuvant chemotherapy. During her chemotherapy treatment, which tumour marker would be most appropriate to monitor disease progression?

- ☐ CA 15-3
- ☐ CA 19-9
- ☐ CA 125
- ☐ Human chorionic gonadotropin (hCG)
- ☐ S-100



Ovarian cancer - CA 125

Important for me **Less important**

CA 125 is the tumour marker most associated with primary peritoneal cancer as well as ovarian cancer and can be used to monitor response to chemotherapy, alongside regular CT scans. It can also be raised in various other cancers.

The other tumour markers are more appropriate for other cancers.

Source:

Sturgeon, C. M., L. C. Lai, and M. J. Duffy. 'Serum Tumour Markers: How to Order and Interpret Them.' BMJ (2009): 852-58.

A 35-year-old woman presents with menorrhagia and a persistent sore throat. A full blood count shows the following:

Hb	6.8 g/dl
Platelets	$45 \times 10^9/l$
WBC	$1.4 \times 10^9/l$
Neutrophils	$0.8 \times 10^9/l$

Which one of the following medications is most likely to account for this finding?

- ☐ Trimethoprim
- ☐ Rifampicin
- ☐ Olanzapine
- ☐ Montelukast
- ☐ Clomifene

Trimethoprim

45%

Rifampicin

9%

Olanzapine

28%

Montelukast

6%

Clomifene

11%

Trimethoprim may cause pancytopenia

Important for me

Less important

A 32-year-old man presents to the emergency department with abdominal pain, numbness and tingling in bilateral lower limbs and feeling generally tearful. There is a history of recurrent abdominal pain and neurological symptoms in the past, however a diagnosis was never found. He is otherwise fit and well. On examination, there is reduced sensation up to the knees in a stocking distribution in the lower limbs. There is no other neurology of note. There is no rash found. You suspect a type of porphyria.

What is the most likely finding to support the diagnosis of this type of porphyria?

- ☐ Raised urine lead level
- ☐ Raised urinary porphobilinogen
- ☐ Raised urinary uroporphyrinogen
- ☐ Raised urinary uroporphyrinogen decarboxylase
- ☐ Raised urinary protoporphyrin

Raised urine lead level	4%
Raised urinary porphobilinogen	57%
Raised urinary uroporphyrinogen	22%
Raised urinary uroporphyrinogen decarboxylase	8%
Raised urinary protoporphyrin	8%

In acute intermittent porphyria, urinary porphobilinogen is typically raised

Important for me Less important

The presentation of abdominal pain, neurological and psychiatric symptoms raises the suspicion of acute intermittent porphyria. In acute intermittent porphyria (AIP), urinary porphobilinogen is typically raised.

Lead level is not usually raised in porphyria.

Uroporphyrinogen is usually raised in porphyria cutanea tarda. The lack of skin lesions makes acute intermittent porphyria more likely.

Uroporphyrinogen decarboxylase is not usually measured.

Urinary protoporphyrin may be slightly raised in AIP but raised porphobilinogen is more likely.

A patient is investigated for leukocytosis. Cytogenetic analysis shows the presence of the following translocation: $t(9;22)(q34;q11)$. Which haematological malignancy is most strongly associated with this translocation?

- ☐ Chronic myeloid leukaemia
- ☐ Acute promyelocytic leukaemia
- ☐ Acute lymphoblastic leukaemia
- ☐ Burkitt's lymphoma
- ☐ Mantle cell lymphoma

Chronic myeloid leukaemia

73%

Acute promyelocytic leukaemia

7%

Acute lymphoblastic leukaemia

10%

Burkitt's lymphoma

5%

Mantle cell lymphoma

5%

CML - Philadelphia chromosome - t(9:22)

Important for me Less important

The Philadelphia translocation is seen in around 95% of patients with chronic myeloid leukaemia. Around 25% of adult acute lymphoblastic leukaemia cases also have this translocation.

Dr Assem

A 25-year-old woman with primary antiphospholipid syndrome is reviewed. She has just had a booking ultrasound at 11 weeks gestation which confirms a viable pregnancy. This is her first pregnancy and she is otherwise fit and well. Which one of the following is the recommend treatment?

- ☐ Aspirin + prednisolone
- ☐ Low-molecular weight heparin
- ☐ Prednisolone + low-molecular weight heparin
- ☐ Aspirin + low-molecular weight heparin
- ☐ Aspirin

Submit answer

Aspirin + prednisolone	5%
Low-molecular weight heparin	18%
Prednisolone + low-molecular weight heparin	5%
Aspirin + low-molecular weight heparin	41%
Aspirin	30%

Antiphospholipid syndrome in pregnancy: aspirin + LMWH

Important for me Less important

The ultrasound at 11 weeks gestation would show a fetal heart if the pregnancy was viable. This patient should therefore be taking both aspirin and low-molecular weight heparin.




 Discuss (2)

 Improve

Antiphospholipid syndrome: pregnancy

Antiphospholipid syndrome is an acquired disorder characterised by a predisposition to both venous and arterial thromboses, recurrent fetal loss and thrombocytopenia. It may occur as a primary disorder or secondary to other conditions, most commonly systemic lupus erythematosus (SLE)

In pregnancy the following complications may occur:

- recurrent miscarriage
- IUGR
- pre-eclampsia
- placental abruption
- pre-term delivery
- venous thromboembolism

Management

- low-dose aspirin should be commenced once the pregnancy is confirmed on urine testing
- low molecular weight heparin once a fetal heart is seen on ultrasound. This is usually discontinued at 34 weeks gestation
- these interventions increase the live birth rate seven-fold

A 58-year-old man presents with polyuria and polydipsia. His body mass index is 32 kg/m^2 . A random blood glucose is 11.5 mmol/l confirming the diagnosis of diabetes mellitus. You decide to start him on metformin.

What is the mechanism of action of metformin?

- ☐ Closure ATP-sensitive K-channels
- ☐ PPAR γ (gamma) agonist
- ☐ Dipeptidyl peptidase-4 (DPP-4)
- ☐ SGLT2 Inhibitors
- ☐ Activation of the AMP-activated protein kinase (AMPK)

Closure ATP-sensitive K-channels

18%

PPAR γ (gamma) agonist

7%

Dipeptidyl peptidase-4 (DPP-4)

3%

SGLT2 Inhibitors

4%

Activation of the AMP-activated protein kinase (AMPK)

67%

Metformin acts by activation of the AMP-activated protein kinase (AMPK)

Important for me Less important

Metformin acts by activation of the AMP-activated protein kinase (AMPK). AMPK is a major cellular regulator of lipid and glucose metabolism. Pharmacological activation of AMPK promotes glucose uptake, fatty acid oxidation, and insulin sensitivity. It also inhibits gluconeogenesis.

Sulphonylureas (e.g. gliclazide) act by closing ATP-sensitive K-channels in pancreatic beta cells. This causes increased insulin secretion.

Thiazolidinediones (e.g. pioglitazone) are PPAR γ (gamma) agonists which cause increased insulin sensitivity.

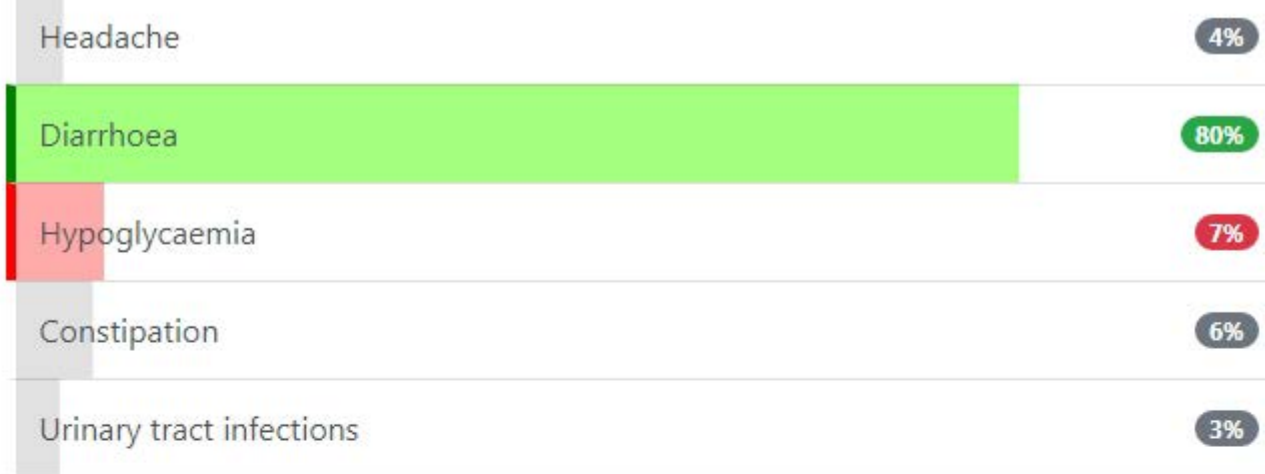
Sitagliptin is a dipeptidyl peptidase-4 (DPP-4) inhibitor. This enzyme breaks down the incretins GLP-1 and GIP. By preventing GLP-1 and GIP inactivation, increased insulin is secreted by the pancreas.

Gliflozin drugs (e.g. dapagliflozin) are a class of medications that inhibit SGLT2 in the kidneys, resulting in decreased reabsorption of glucose.

Dr Assem

You are an F2 working in general practice. You are seeing a 64-year-old female who has type II diabetes. Her HbA1c remains high despite a trial of diet and lifestyle changes. You plan to start her on the most commonly prescribed first-line medication for type II diabetes. Which side effect should you warn her is the most likely?

- ☐ Headache
- ☐ Diarrhoea
- ☐ Hypoglycaemia
- ☐ Constipation
- ☐ Urinary tract infections



Gastrointestinal side-effects such as diarrhoea and bloating are a common side effect with metformin

Important for me Less important

The correct answer is number 2. NICE that standard release metformin should be the initial drug of choice for patients with type II diabetes. Gastrointestinal side effects such as diarrhoea, flatulence and bloating are a very common side effect of metformin. It should be started at a low dose and gradually increased to reduce the risk. GI side effects are usually less with modified release metformin than standard release.

A headache can be a side effect of metformin but is less common than GI side effects. Hypoglycaemia can occur with use of other diabetic medications, including sulphonylureas and insulin, but does not occur with metformin. Urinary tract infections and thrush are more common with SGLT2 inhibitors which increase the excretion of glucose in urine. Swelling of the feet and ankles can occur with thiazolidinediones.

A 30-year-old female has been admitted to the medical ward with an acute infection. She had a case of anaphylaxis which was thought to be due to amoxicillin at age 20. She has since been seen by the allergy specialist and is now known to have an IgE mediated penicillin allergy. Which of the following antibiotics would you be most wary of using in this patient?

- ☐ Gentamicin
- ☐ Ciprofloxacin
- ☐ Trimethoprim
- ☐ Cefalexin
- ☐ Metronidazole



A small proportion (0.5 - 6.5%) of patients with an IgE mediated penicillin allergy will also be allergic to cephalosporins

Important for me Less important

This patient is known to have a severe penicillin allergy. None of the above antibiotics are penicillin based. However, the BNF states that 0.5 - 6.5% of patients who are proven to have an IgE mediated penicillin allergy will also be allergic to cephalosporins, including cefalexin. You would, therefore, be most wary of giving ceftriaxone to this patient.

Penicillins, cephalosporins, and carbapenems are all members of the beta-lactam group of antibiotics and share a common beta-lactam ring. There is, therefore, a small risk of allergy cross-over between all these antibiotics. The rates of allergy cross-over are lower with second and third generation cephalosporins than first generation cephalosporins such as cefalexin.

Reported penicillin allergy is very common, with up to 10% of patients claiming to be allergic to penicillin. However, less than 10% of these people have a true IgE mediated allergy to penicillin. It is important to question the patient carefully to ascertain what symptoms they had on exposure to penicillin. Symptoms such as an urticarial rash or itching make it more likely that they have an IgE mediated allergy.

BNF:

<https://bnf.nice.org.uk/drug-class/penicillins-2.html#allergyAndCrossSensitivity>

A 43-year-old woman is about to start treatment with trastuzumab for metastatic breast cancer. What is the most important investigation to perform prior to initiating treatment?

- ☐ Pulmonary function tests
- ☐ Echo
- ☐ Liver function tests
- ☐ Chest x-ray
- ☐ Glucose tolerance test

Pulmonary function tests

14%

Echo

49%

Liver function tests

15%

Chest x-ray

13%

Glucose tolerance test

9%

Trastuzumab (Herceptin) - cardiac toxicity is common

Important for me

Less important

A 35-year-old man presents to the emergency department after a night out, having taken an unknown substance. He is known to have a history of depression.

On examination his Glasgow coma scale (GCS) is 13/15, pupils are dilated and divergent. He is tachycardic with a heart rate of 110/min, his blood pressure is 124/70mmHg. His ECG shows sinus rhythm, with a lengthened QTc duration of 480msec. He is dry to the touch.

Which substance is he most likely to have ingested?

☐ Cocaine

☐ Sertraline

☐ Diazepam

☐ Amitriptyline

☐ MDMA

Cocaine	22%
Sertraline	12%
Diazepam	4%
Amitriptyline	44%
MDMA	18%

The correct answer here is Amitriptyline - a tricyclic antidepressant (TCA) overdose.

Whilst the main effect of TCAs is to increase serotonin and noradrenaline in the brain by slowing re-uptake, they also block histamine, cholinergic and alpha 1 receptors. Therefore in overdose the anti-cholinergic effects give dilated pupils, dry skin, confusion, urinary retention and tachycardia. Divergent pupils are a common finding in tricyclic overdose. TCAs are also cardiotoxic by inactivating sodium channels in the heart leading to, as seen here, a potential prolongation of the QTc interval and a widened QRS complex. This can potentially lead to ventricular arrhythmias.

Other effects of TCAs not included here include seizures and a metabolic acidosis.

In overdose sertraline may present with serotonin syndrome. The Glasgow coma scale may be reduced and pupils dilated, but skin would not be dry. A classic feature of serotonin syndrome is hyperreflexia, often with muscle rigidity and tremor, which is not described here. Additionally QTc prolongation is unlikely with selective serotonin reuptake inhibitors (citalopram is an exception).

Cocaine produces sympathetic effects - agitation, restlessness, increased heart rate and blood pressure. In severe toxicity hyperthermia and rhabdomyolysis may occur. It would not cause a reduced GCS or altered QRS duration on ECG.

MDMA (ecstasy) excess presents similarly to cocaine, with increased psychomotor agitation, palpitations and hyperthermia. Additionally teeth grinding (bruxism) is noted frequently.

Diazepam ingestion could cause a reduced GCS due to its sedative effects. However it would not generally affect pupil size, heart rate or ECG. It is associated with respiratory depression.

Which one of the following is least associated with cocaine toxicity?

☐ Metabolic alkalosis

☐ Hyperthermia

☐ Psychosis

☐ Rhabdomyolysis

☐ Seizures

Metabolic alkalosis

66%

Hyperthermia

10%

Psychosis

8%

Rhabdomyolysis

9%

Seizures

7%

Which of the following conditions may not be treated by dopamine receptor agonists?

- ☐ Parkinson's disease
- ☐ Prolactinoma
- ☐ Nausea
- ☐ Cyclical breast disease
- ☐ Acromegaly

Parkinson's disease

9%

Prolactinoma

14%

Nausea

38%

Cyclical breast disease

19%

Acromegaly

19%

The INR of a patient who has recently started treatment for tuberculosis drops from 2.6 to 1.3. Which one of the following medications is most likely to be responsible?

- ☐ Rifampicin
- ☐ Streptomycin
- ☐ Ethambutol
- ☐ Isoniazid
- ☐ Pyrazinamide

Rifampicin

60%

Streptomycin

6%

Ethambutol

7%

Isoniazid

21%

Pyrazinamide

7%

Rifampicin is a P450 enzyme inductor

Important for me Less important

Rifampicin is a P450 enzyme inducer and will therefore increase the metabolism of warfarin, therefore decreasing the INR.

Dr Assem

A 31-year-old man is diagnosed with pulmonary tuberculosis. He is commenced on rifampicin, isoniazid, pyrazinamide and ethambutol. Two months after commencing treatment routine liver function tests show the following:

Bilirubin	29 $\mu\text{mol/l}$
ALP	179 u/l
ALT	163 u/l
γGT	219 u/l
Albumin	39 g/l

Which one of the following factors is most likely to increase his risk of isoniazid toxicity?

- ☐ Concurrent use of lansoprazole
- ☐ Male gender
- ☐ Acetylator status
- ☐ Amount of aldehyde dehydrogenase
- ☐ Chronic kidney disease stage 3

Concurrent use of lanzoprazole	11%
Male gender	3%
Acetylator status	61%
Amount of aldehyde dehydrogenase	10%
Chronic kidney disease stage 3	15%

It was previously thought that 'fast acetylators' were more at risk of isoniazid than other patients. Recent research now suggests however that slow acetylators are actually more likely to suffer hepatotoxicity.

Men, unusually, are actually less likely to develop isoniazid hepatotoxicity.

His concurrent use of rifampicin and pyrazinamide is also a risk factor isoniazid hepatotoxicity.

Which one of the following drugs is most likely to cause impaired glucose tolerance?

☐ Sulfasalazine

☐ Azathioprine

☐ Leflunomide

☐ Methotrexate

☐ Tacrolimus

Which one of the following drugs is most likely to cause impaired glucose tolerance?

Sulfasalazine

15%

Azathioprine

9%

Leflunomide

12%

Methotrexate

10%

Tacrolimus

53%

Tacrolimus is a cause of impaired glucose tolerance

Important for me Less important

Which one of the following drugs may be cleared by haemodialysis?

☐ Beta-blockers

☐ Tricyclics

☐ Aspirin

☐ Benzodiazepines

☐ Digoxin

Dr Assem

Beta-blockers

8%

Tricyclics

18%

Aspirin

44%

Benzodiazepines

13%

Digoxin

17%

Dr Assem

Which of the following drugs is most likely to cause impaired glucose tolerance?

☐ Bromocriptine

☐ Interferon-alpha

☐ Strontium

☐ Imipramine

☐ Montelukast

Bromocriptine

25%

Interferon-alpha

42%

Strontium

8%

Imipramine

15%

Montelukast

11%

Glycaemic control in diabetes may be worsened by interferon-alpha

Important for me

Less important

A 23-year-old man is taken to the Emergency Department by his friends after a night out. He was found acting erratically outside a nightclub as they were waiting for a taxi. His friend reports that they snorted a white powder two hours earlier. This is described as 'M-CAT', a 'legal high' they obtained from the internet.

When managing this patient, which drug group is it most similar to?

- ☐ Ketamine
- ☐ Amphetamine
- ☐ Opioid
- ☐ Benzodiazepine
- ☐ LSD

Ketamine

14%

Amphetamine

50%

Opioid

10%

Benzodiazepine

6%

LSD

19%

Dr. Assun

A 69-year-old male patient presents to the GP surgery with a 6-month history of persistent dry cough and shortness of breath on exertion. His past medical history include Parkinson's disease, epilepsy, hypertension, type 2 diabetes mellitus. His current medications include amlodipine, sodium valproate, bromocriptine, bisoprolol and metformin.

Which is most likely cause of his presenting symptoms?

☐ Sodium valproate

☐ Bromocriptine

☐ Amlodipine

☐ Bisoprolol

☐ Metformin

Sodium valproate

11%

Bromocriptine

48%

Amlodipine

14%

Bisoprolol

24%

Metformin

4%

Ergot-derived dopamine receptor agonists may cause pulmonary fibrosis

Important for me [Less important](#)

This patient has symptoms of pulmonary fibrosis. Ergot-derived dopamine receptor agonists such as bromocriptine may cause pulmonary fibrosis.

Sodium valproate, amlodipine, bisoprolol and metformin do not usually cause pulmonary fibrosis.

Dr. Arsem

A 58-year-old female presents with flushing, diarrhoea and hypotension. A small bowel MRI demonstrates a mass in the ileum. A diagnosis of carcinoid syndrome is made. Your consultant initiates treatment with octreotide.

What is the mechanism of action of octreotide?

- ☐ Somatostatin antagonist
- ☐ Glucagon-like peptide-1 receptor agonists
- ☐ Somatostatin analogue
- ☐ Glucagon-like peptide-1 receptor antagonist
- ☐ Anti-serotonergic

Somatostatin antagonist

18%

Glucagon-like peptide-1 receptor agonists

5%

Somatostatin analogue

67%

Glucagon-like peptide-1 receptor antagonist

6%

Anti-serotonergic

4%

Octreotide is a somatostatin analogue

Important for me Less important

Octreotide is a somatostatin analogue. It is a potent inhibitor of gastrointestinal secretions hence why its a first line treatment for carcinoid syndrome. It is also a potent inhibitor of growth hormone, glucagon, and insulin.

Cyproheptadine is an anti-histamine drug which has anti-serotonergic properties. It can also be used in carcinoid syndrome.

Glucagon-like peptide-1 receptor agonists are used to treat diabetes mellitus. They are insulin secretagogues.

Dr. Assem

A 24-year-old lady presents with abdominal pain. She states that she is at 24 weeks gestation of pregnancy. She has no other past medical history. On examination she has rhythmic contractions of her abdomen which are occurring four times per minute. A speculum examination shows a dilated cervix.

Which drug could have precipitated this presentation?

- ☐ Nimodipine
- ☐ Cocaine
- ☐ Terbutaline
- ☐ Magnesium sulphate
- ☐ Indomethacin

Nimodipine

9%

Cocaine

43%

Terbutaline

18%

Magnesium sulphate

8%

Indomethacin

23%

Cocaine can induce preterm labour

Important for me Less important

Cocaine is a sympathomimetic drug. Its use during pregnancy can result in pre-term labour (< 37 weeks gestation), congenital anomalies, and intrauterine growth retardation (IUGR). Cocaine can initiate uterine contractions, and is therefore the most likely agent to predispose to pre-term labour.

All the other options are tocolytics which may be used during pre-term labour to slow down and reduce the amplitude of contractions.

Dr Assem

Which one of the following statements regarding metformin is true?

- ☐ Should be stopped in a patient admitted with a myocardial infarction
- ☐ Hypoglycaemia is a recognised adverse effect
- ☐ May cause a metabolic alkalosis
- ☐ May aggravate necrobiosis lipoidica diabetorum
- ☐ Increases vitamin B12 absorption

Should be stopped in a patient admitted with a myocardial infarction

74%

Hypoglycaemia is a recognised adverse effect

4%

May cause a metabolic alkalosis

5%

May aggravate necrobiosis lipoidica diabetorum

13%

Increases vitamin B12 absorption

4%

Metformin should be stopped following a myocardial infarction due to the risk of lactic acidosis. It may be introduced at a later date. Diabetic control may be achieved through the use of an insulin/dextrose infusion (e.g. the DIGAMI regime)

Dr. Asem

A 27-year-old man had presented to accident and emergency 4 days ago following an intentional paracetamol overdose. He had taken fifteen 500mg tablets, all at once. He denies any alcohol intake. Bloods 4 hours after ingestion showed

Paracetamol	14 mg/l
INR	1
Liver enzymes	No abnormality detected
Bilirubin	Mild elevation

He was seen by the mental health team and discharged. You gave him the advice to attend his GP to have his bloods repeated to see if the hyperbilirubinaemia had settled. Today he has presented to the hospital from his GP with 'abnormal blood results.'

Bilirubin	No abnormality detected
Urea	21 mmol/l
Creatinine	300 μ mol/l

What is the likely cause of these results?

- ☐ Pre-renal AKI secondary to dehydration
- ☐ Spurious blood result
- ☐ Delayed paracetamol nephrotoxicity
- ☐ Minimal change nephropathy
- ☐ Berger's disease

Dr Assem

Pre-renal AKI secondary to dehydration

14%

Spurious blood result

6%

Delayed paracetamol nephrotoxicity

66%

Minimal change nephropathy

8%

Berger's disease

6%

This gentleman's blood results demonstrate an acute kidney injury. There is nothing in the history to suggest that the patient is dehydrated and this would be very unusual in an otherwise well 27-year-old man. Minimal change nephropathy typically presents with a nephrotic picture of kidney injury, whilst Berger's more commonly presents with isolated haematuria.

Whilst paracetamol overdose is well known to cause hepatotoxicity, delayed nephrotoxicity is an important entity to be aware of, especially in significant overdose. Appropriate monitoring of a patient's blood tests is important, as per the guidance of TOXBASE.

The following reference provides more details and a case study
<https://www.ncbi.nlm.nih.gov/pubmed/18338302>

A 56-year-old man with a history of epilepsy, atrial fibrillation and ischaemic heart disease is noted to have a rash on his forearms and face in the cardiology clinic. Which one of the following drugs is most likely to be responsible?

- ☐ Verapamil
- ☐ Carbamazepine
- ☐ Amiodarone
- ☐ Digoxin
- ☐ Clopidogrel

Verapamil

6%

Carbamazepine

22%

Amiodarone

60%

Digoxin

5%

Clopidogrel

6%

A 55-year-old diabetic man presents to clinic concerned about erectile dysfunction. What is the mechanism of action of sildenafil?

- ☐ Phosphodiesterase type V inhibitor
- ☐ Nitric oxide synthetase inhibitor
- ☐ Nitric oxide donor
- ☐ Non-selective phosphodiesterase inhibitor
- ☐ Phosphodiesterase type IV inhibitor

Phosphodiesterase type V inhibitor

70%

Nitric oxide synthetase inhibitor

4%

Nitric oxide donor

3%

Non-selective phosphodiesterase inhibitor

4%

Phosphodiesterase type IV inhibitor

19%

Sildenafil - phosphodiesterase type V inhibitor

Important for me Less important

Sildenafil is a phosphodiesterase type V inhibitor

Dr Assem

A 43-year-old man from South Africa is reviewed in clinic. He has recently started treatment for tuberculosis but is complaining of a deterioration in his vision. Which one of the following drugs is most likely to cause decreased visual acuity?

- ☐ Rifampicin
- ☐ Streptomycin
- ☐ Isoniazid
- ☐ Ethambutol
- ☐ Pyrazinamide

A 43-year-old man from South Africa is reviewed in clinic. He has recently started treatment for tuberculosis but is complaining of a deterioration in his vision. Which one of the following drugs is most likely to cause decreased visual acuity?



Optic neuritis is common in patients taking ethambutol

Important for me Less important

Isoniazid may also cause optic neuritis but it is not as common a cause as ethambutol.

A 21-year-old student is brought to the Emergency Department by his friends due to him being confused. They report he has been complaining of headaches for the past few weeks. He has a low-grade pyrexia and on examination is noted to have abnormally pink mucosa. What is the most likely diagnosis?

☐ Carbon monoxide poisoning

☐ Meningitis

☐ Paracetamol overdose

☐ Subarachnoid haemorrhage

☐ Methaemoglobinaemia

Carbon monoxide poisoning	68%
Meningitis	4%
Paracetamol overdose	5%
Subarachnoid haemorrhage	3%
Methaemoglobinaemia	20%

Confusion and pink mucosae are typical features of carbon monoxide poisoning. A low-grade pyrexia is seen in a minority of cases.

In the Vaughan Williams classification of antiarrhythmics disopyramide is an example of a:

- ☐ Class Ia agent
- ☐ Class Ib agent
- ☐ Class Ic agent
- ☐ Class II agent
- ☐ Class IV agent

Class Ia agent

43%

Class Ib agent

20%

Class Ic agent

18%

Class II agent

10%

Class IV agent

9%

A 45-year-old man is started on ciclosporin following a renal transplant. Which one of the following adverse effects is most likely to occur?

- ☐ Depression
- ☐ Increased risk of ischaemic heart disease
- ☐ Pulmonary fibrosis
- ☐ Optic neuritis
- ☐ Nephrotoxicity

Depression

5%

Increased risk of ischaemic heart disease

10%

Pulmonary fibrosis

14%

Optic neuritis

8%

Nephrotoxicity

63%

Ciclosporin may cause nephrotoxicity

Important for me Less important

A 27-year-old woman with a history of depression presents to the Emergency Department. She reports taking 50 paracetamol tablets yesterday. Bloods are taken on admission. Which one of the following would most strongly indicate the need for a liver transplant?

☐ Blood glucose 2.2 mmol/l

☐ ALT 2364 iu/l

☐ INR 4.1

☐ Creatinine 230 μ mol/l

☐ Arterial pH 7.27



The arterial pH is the single most important factor according to the King's College Hospital criteria for liver transplantation.

Which one of the following is not an indication for haemodialysis in salicylate overdose?

- ☐ Acute renal failure
- ☐ Seizures
- ☐ Serum concentration = 400 mg/l
- ☐ Pulmonary oedema
- ☐ Metabolic acidosis resistant to treatment

Acute renal failure

11%

Seizures

14%

Serum concentration = 400 mg/l

55%

Pulmonary oedema

13%

Metabolic acidosis resistant to treatment

7%

A serum concentration of greater than 700mg/l is an indication for haemodialysis

Which of the following drugs is least likely to be affected by a patient's acetylase status?

- ☐ Hydralazine
- ☐ Isoniazid
- ☐ Rifampicin
- ☐ Procainamide
- ☐ Sulphonamides

Hydralazine

14%

Isoniazid

12%

Rifampicin

50%

Procainamide

13%

Sulphonamides

11%

A 65-year-old man with a history of ischaemic heart disease is admitted with chest pain. The 12-hour troponin T is negative. During admission his medications were altered to reduce the risk of cardiovascular disease and to treat previously undiagnosed type 2 diabetes mellitus. Shortly after discharge he presents to his GP complaining of diarrhoea. Which one of the following medications is most likely to be responsible?

- ☐ Gliclazide
- ☐ Clopidogrel
- ☐ Rosiglitazone
- ☐ Metformin
- ☐ Atorvastatin

Gliclazide	6%
Clopidogrel	3%
Rosiglitazone	5%
Metformin	83%
Atorvastatin	3%

Gastrointestinal side-effects such as diarrhoea and bloating are a common side effect with metformin

Important for me Less important

Gastrointestinal problems are a common side-effect of many medications but are frequently seen in patients taking metformin

If this patient had a raised troponin T then metformin may not be suitable as it is contraindicated following recent episodes of tissue hypoxia.

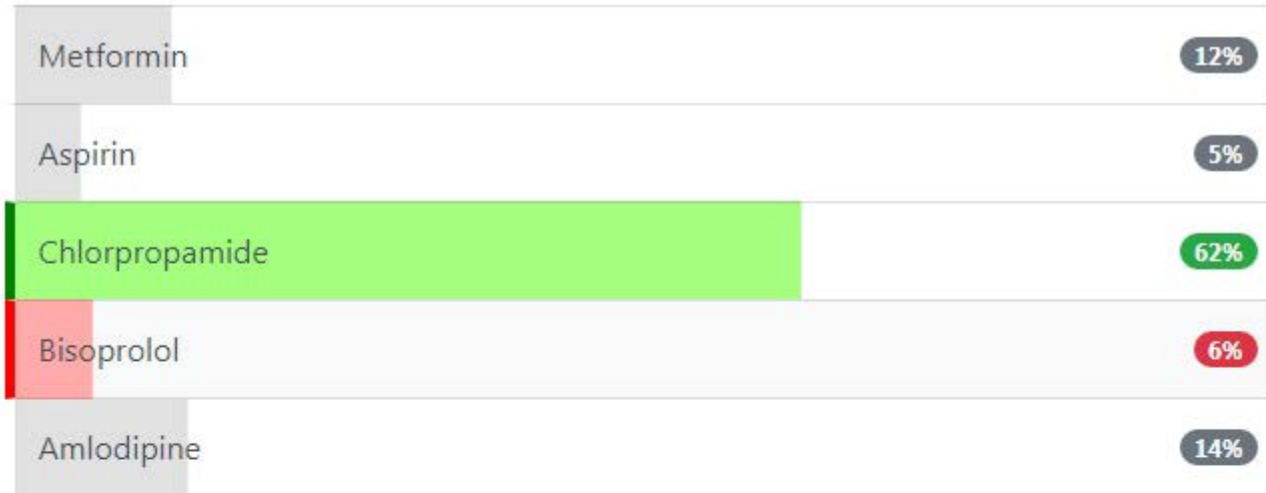
A 75-year-old woman presents to the emergency department with a fall. She cannot recall the exact events of the fall but does report a 2-month history of recurrent nausea and headache. Her past medical history includes type 2 diabetes mellitus, hypertension and ischaemic heart disease. Physical examination is unremarkable except an unsteady gait although no ataxia evident. Her blood tests are as follows:

Hb	124 g/dL
Na ⁺	125 mmol/L
K ⁺	4.8 mmol/L
Creatinine	59 µmol/L
Urea	5.2 mmol/L
Serum osmolality	265 mOsm/kg (reference range 275–295 mOsm/kg)

Which medication may be the cause for this clinical picture?

- ☐ Metformin
- ☐ Aspirin
- ☐ Chlorpropamide
- ☐ Bisoprolol
- ☐ Amlodipine

Dr Assem



Sulphonylureas may cause syndrome of inappropriate ADH

Important for me Less important

Hyponatraemia in the context of euvoalaemia and low serum osmolality suggests syndrome of inappropriate ADH (SIADH). Sulphonylureas (particularly long-acting ones such as chlorpropamide) are well-established causes of the syndrome of inappropriate ADH¹.

Metformin, aspirin, bisoprolol and amlodipine do not usually cause SIADH.

1. Sola D, Rossi L, Schianca GPC, et al. Sulfonylureas and their use in clinical practice. Archives of Medical Science: AMS. 2015;11(4):840-848. doi:10.5114/aoms.2015.53304.

Which one of the following side-effects is least recognised in patients taking ciclosporin?

- ☐ Hypokalaemia
- ☐ Hyperplasia of the gum
- ☐ Hypertension
- ☐ Tremor
- ☐ Excessive hair growth

Hypokalaemia

74%

Hyperplasia of the gum

5%

Hypertension

5%

Tremor

7%

Excessive hair growth

9%

Ciclosporin side-effects: everything is increased - fluid, BP, K^+ , hair, gums, glucose

Important for me Less important

Hyperkalaemia rather than hypokalaemia is seen with ciclosporin use

A 57-year-old man with a history of ischaemic heart disease is keen to try sildenafil for erectile dysfunction. Which one of the following medications may contraindicate its use?

☐ Nebivolol

☐ Losartan

☐ Nicorandil

☐ Nifedipine

☐ Ramipril

Nebivolol

8%

Losartan

3%

Nicorandil

70%

Nifedipine

15%

Ramipril

4%

PDE 5 inhibitors (e.g. sildenafil) - contraindicated by nitrates and nicorandil

Important for me Less important

Nicorandil has a nitrate component as well as being a potassium channel activator

A 25-year-old female who works in a photograph development laboratory is taken to the Emergency Department due to confusion. On admission she is hypoxic and hypotensive. Cyanide poisoning is suspected following discussion with the local poisons unit. What is the definitive treatment?

Haemodialysis

13%

Hydroxocobalamin

66%

Penicillamine

9%

Ferrous sulphate

4%

Desferioxamine

8%

Haemodialysis

13%

Hydroxocobalamin

66%

Penicillamine

9%

Ferrous sulphate

4%

Desferioxamine

8%

A 44-year-old female with a history of alcohol excess and cirrhosis presents to the emergency department with palpitations. You receive a call from the laboratory who telephone through her electrolyte results:

Sodium	133 mmol/l
Potassium	3.8 mmol/l
Calcium	2.02 mmol/l
Phosphate	0.82 mmol/l
Magnesium	0.22 mmol/l

Aside from her alcohol excess, which of her medications is most likely to contribute to her hypomagnasaemia?

- ☐ Carvedilol
- ☐ Furosemide
- ☐ Omeprazole
- ☐ Thiamine
- ☐ Spironolactone

Carvedilol	6%
Furosemide	59%
Omeprazole	18%
Thiamine	6%
Spironolactone	12%

Both loop and thiazide diuretics inhibit the resorption of magnesium in the kidney.

Potassium-sparing diuretics such as spironolactone are not associated with hypomagnesaemia.

Protein pump inhibitors such as omeprazole are associated with low magnesium levels when taken in conjunction with loop or thiazide diuretics but are not independently associated with hypomagnesaemia.

Thiamine and carvedilol have no effect on magnesium haemostasis.

A patient is started on the monoclonal antibody trastuzumab. What is the most likely indication?

- ☐ Crohn's disease
- ☐ Chronic lymphocytic leukaemia
- ☐ Renal cancer
- ☐ Colorectal cancer
- ☐ Breast cancer

Crohn's disease

7%

Chronic lymphocytic leukaemia

8%

Renal cancer

5%

Colorectal cancer

11%

Breast cancer

69%

Trastuzumab (Herceptin) - monoclonal antibody that acts on the HER2/neu receptor

Important for me Less important

An 85-year-old gentleman with a background of osteoporosis and chronic kidney disease was admitted following a fall at home. He was experiencing significant lower back pain. A lumbar spine x-ray was showing signs of a fractured lumbar vertebra. A subsequent MRI lumbar/sacral scan showed a new L3 burst fracture with no evidence of cord compression. A neurosurgical opinion was obtained who advised conservative management in the form of pain control, physiotherapy and mobilisation as pain allows. Given his background of chronic renal impairment with a creatinine clearance of 21ml/min, he was started on a Buprenorphine patch. Which of the following opioids would be safest to use for his breakthrough pain?

- ☐ Pethidine
- ☐ Diamorphine
- ☐ Morphine
- ☐ Oxycodone
- ☐ Ibuprofen

Pethidine

17%

Diamorphine

18%

Morphine

14%

Oxycodone

48%

Ibuprofen

3%

Oxycodone is a safer opioid to use in patients with moderate to end-stage renal failure

Important for me Less important

Active metabolites of morphine accumulate in renal failure which means that long-term use is contraindicated in patients with moderate/severe renal failure. These toxic metabolites can accumulate causing toxicity and risk overdose. Oxycodone is mainly metabolised in the liver and thus safer to use in patients with moderate to end-stage renal failure with dose reductions.

Dr Assem

A 67-year-old woman is noted to have corneal opacities during a routine optician's appointment. These are not affecting her vision. Which one of the following drugs is most likely to be the cause?

- ☐ Amiodarone
- ☐ Sodium valproate
- ☐ Methotrexate
- ☐ Frusemide
- ☐ Digoxin

Drug	Percentage
Amiodarone	68%
Sodium valproate	6%
Methotrexate	10%
Frusemide	7%
Digoxin	9%

68%

Sodium valproate

6%

Methotrexate

10%

Frusemide

7%

Digoxin

9%

Amiodarone therapy can result in both corneal opacities and optic neuritis

Dr Assem

Which one of the following drugs is most likely to result in a photosensitive rash?

- ☐ Gentamicin
- ☐ Erythromycin
- ☐ Penicillin
- ☐ Tetracycline
- ☐ Amoxicillin

Gentamicin

5%

Erythromycin

9%

Penicillin

15%

Tetracycline

68%

Amoxicillin

4%

Dr Assem

A 56-year-old man from Pakistan presents to his GP with numbness and tingling in his feet for 1 week. He tells you he has recently started some new medications. Looking at his medical history you discover he has recently been diagnosed with tuberculosis and hypertension.

Which of the following medications are most likely to be causing the problem?

- ☐ Rifampicin
- ☐ Amlodipine
- ☐ Ramipril
- ☐ Isoniazid
- ☐ Pyrazinamide

Rifampicin

7%

Amlodipine

4%

Ramipril

4%

Isoniazid

69%

Pyrazinamide

16%

Peripheral neuropathy is a commonly recognised side effect of isoniazid. Although paraesthesia is listed under the side effects for amlodipine in the BNF, it is uncommon. In this case isoniazid is the most likely answer.

Drug**Most common side effects**

Rifampicin

Orange bodily fluids, rash, hepatotoxicity, drug interactions

Isoniazid

Peripheral neuropathy, psychosis, hepatotoxicity

Pyrazinamide

Arthralgia, gout, hepatotoxicity, nausea

Ethambutol

Optic neuritis, rash

Dr Assem

A 73-year-old man is prescribed cetuximab after being diagnosed with metastatic colorectal cancer. What target is this monoclonal antibody directed against?

- ☐ Vascular endothelial growth factor receptor
- ☐ Angiotensin-2 receptors
- ☐ CD20 protein complex
- ☐ Epidermal growth factor receptor
- ☐ Fibroblast growth factor receptor

Vascular endothelial growth factor receptor

22%

Angiopoietin-2 receptors

6%

CD20 protein complex

16%

Epidermal growth factor receptor

48%

Fibroblast growth factor receptor

8%

Cetuximab - monoclonal antibody against the epidermal growth factor receptor

Important for me Less important

A 26-year-old woman with a history of schizophrenia is reviewed in the Emergency Department. Her carer reports that she has been 'staring' for the past few hours but has now developed abnormal head movements and has gone 'cross-eyed'. On examination the patients neck is extended and positioned to the right. Her eyes are deviated upwards and are slightly converged. Given the likely diagnosis, what is the most appropriate treatment?

☐ Procyclidine

☐ Dopamine

☐ Selegiline

☐ Haloperidol

☐ Diazepam

Drug	Percentage
Procyclidine	54%
Dopamine	9%
Selegiline	7%
Haloperidol	12%
Diazepam	17%

54%

Dopamine

9%

Selegiline

7%

Haloperidol

12%

Diazepam

17%

Benztropine and diphenhydramine are alternative options.

Dr Assem

Which one of the following types of reaction takes place in phase II metabolism of a drug?

☐ Conjugation

☐ Hydrolysis

☐ Reduction

☐ Deamination

☐ Dealkylation

Conjugation

64%

Hydrolysis

10%

Reduction

12%

Deamination

9%

Dealkylation

5%

Drug metabolism

- phase I: oxidation, reduction, hydrolysis
- phase II: conjugation

Important for me Less important

A 48-year-old female is admitted with cellulitis of her right lower limbs. A swab culture grows MRSA sensitive to vancomycin, teicoplanin and linezolid. You decide to treat her with teicoplanin.

What is the mechanism of action of teicoplanin?

- ☐ Inhibits bacterial protein synthesis
- ☐ Inhibits bacterial DNA synthesis
- ☐ Inhibits bacterial cell wall formation
- ☐ Inhibits bacterial folic acid formation
- ☐ Inhibits bacterial RNA synthesis

Inhibits bacterial protein synthesis	20%
Inhibits bacterial DNA synthesis	14%
Inhibits bacterial cell wall formation	50%
Inhibits bacterial folic acid formation	7%
Inhibits bacterial RNA synthesis	8%

Teicoplanin is similar to vancomycin (e.g. a glycopeptide antibiotic), but has a significantly longer duration of action, allowing once daily administration after the loading dose

Important for me Less important

Teicoplanin is similar to vancomycin (e.g. a glycopeptide antibiotic), but has a significantly longer duration of action, allowing once daily administration after the loading dose. It inhibits bacterial cell wall formation.

Antibiotics that inhibit bacterial protein synthesis include macrolides, aminoglycosides, and tetracyclines.

Antibiotics that inhibit bacterial DNA synthesis include the quinolones (e.g. ciprofloxacin).

Antibiotics that inhibit bacterial RNA synthesis include rifampicin.

Antibiotics that inhibit bacterial folic acid formation include trimethoprim and cotrimoxazole.

A 62-year-old woman with a history of recurrent deep vein thrombosis secondary to antiphospholipid syndrome presents for review. She has taken warfarin for the past 7 years, with a target INR of 2.0 - 3.0. Her control is normally very good but her last reading was 1.2. Which one of the following would explain her current INR?

- ☐ Starting fluoxetine for depression
- ☐ The formation of lupus anticoagulant autoantibodies
- ☐ Giving up smoking
- ☐ Recent rifampicin as she was a contact of a patient with meningococcal meningitis
- ☐ A course of ciprofloxacin for a urinary tract infection

Starting fluoxetine for depression

6%

The formation of lupus anticoagulant autoantibodies

4%

Giving up smoking

9%

Recent rifampicin as she was a contact of a patient with meningococcal meningitis

65%

A course of ciprofloxacin for a urinary tract infection

16%

Rifampicin is a P450 enzyme inductor

Important for me Less important

Which one of the following adrenoceptors causes inhibition of pre-synaptic neurotransmitter release in response to sympathetic stimulation?

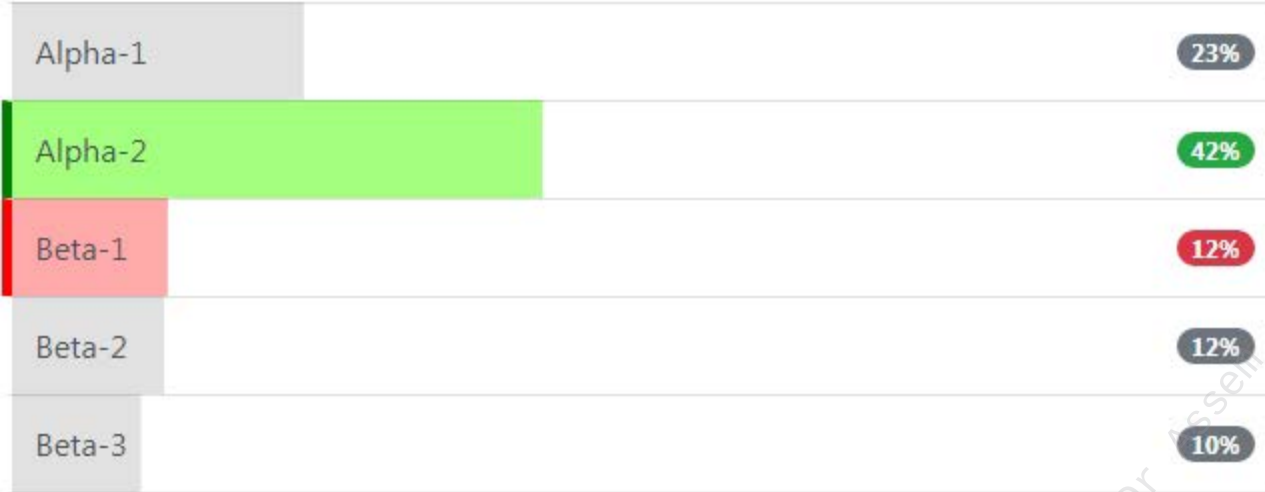
☐ Alpha-1

☐ Alpha-2

☐ Beta-1

☐ Beta-2

☐ Beta-3



Which of the following drugs is considered most likely to precipitate an attack of acute intermittent porphyria?

☐ Morphine

☐ Aspirin

☐ Atenolol

☐ Metformin

☐ Oral contraceptive pill

Morphine

8%

Aspirin

21%

Atenolol

11%

Metformin

9%

Oral contraceptive pill

51%

Which of the following drugs is considered least likely to precipitate an attack of acute intermittent porphyria?

- ☐ Diazepam
- ☐ Penicillin
- ☐ Thiopentone
- ☐ Sulphonamides
- ☐ Alcohol

Diazepam

26%

Penicillin

38%

Thiopentone

16%

Sulphonamides

11%

Alcohol

9%

A 54-year-old woman is admitted to the Medical Admissions Unit following a collapse. Bloods taken on admission show the following:

Magnesium	0.40 mmol/l
-----------	-------------

Which one of the following factors is most likely to be responsible for this result?

- ☐ Excessive resuscitation with intravenous saline
- ☐ Frusemide therapy
- ☐ Digoxin therapy
- ☐ Rhabdomyolysis
- ☐ Hypothermia

Excessive resuscitation with intravenous saline

13%

Furosemide therapy

46%

Digoxin therapy

17%

Rhabdomyolysis

13%

Hypothermia

12%

A 13-year-old boy has attended the acute medical unit with severe lethargy and jaundice. He has recently taken a medication that his mother feels may have been the cause. She noted her brother once had a similar reaction to a tattoo. You suspect he may have glucose-6-phosphate dehydrogenase (G6PD) deficiency.

Which of the following drugs would most likely provoke a haemolytic crisis in G6PD deficiency?

- ☐ Trimethoprim
- ☐ Ibuprofen
- ☐ Ciprofloxacin
- ☐ Chloroquine
- ☐ Sodium valproate

Ibuprofen	6%
Ciprofloxacin	33%
Chloroquine	40%
Sodium valproate	6%

Ciprofloxacin is contraindicated in G6PD deficiency

Important for me Less important

The answer is ciprofloxacin. G6PD deficiency is a (usually) X-linked recessive condition that predisposes patients to haemolytic crises following oxidative stress. This most commonly manifests in the form of certain medications, but some foods (broad beans) and even henna tattoos can prompt a crisis.

Variation occurs in known triggers amongst subjects. However, some triggers have a higher likelihood than others - and as such are contraindicated absolutely. Quinolones (ciprofloxacin, norfloxacin & moxifloxacin) have a very high theoretical risk of haemolysis. Other drugs with a high risk include primaquine, sulfonamides, methylene blue, dapsone & doxorubicin. Chloroquine has a small risk of haemolysis. Trimethoprim, ibuprofen and sodium valproate have no theoretical risk.

This table provides a good summary:

<http://www.cych.org.tw/pharm/MIMS%20Summary%20Table-G6PD.pdf>

A 46-year-old woman who has recently been diagnosed as having non-Hodgkin's lymphoma is about to start CHOP chemotherapy (cyclophosphamide, hydroxydaunorubicin, vincristine and prednisolone). Her bloods are as follows:

Hb	11.8 g/dl
Platelets	$423 \times 10^9/l$
WBC	$11.2 \times 10^9/l$

Na ⁺	143 mmol/l
K ⁺	3.9 mmol/l
Urea	6.2 mmol/l
Creatinine	78 μ mol/l
Uric acid	0.45 mmol/l

Ciprofloxacin is also prescribed to reduce the risk of neutropenic sepsis. Which other drug should be added to lower the risk of complications?

- ☐ Tranexamic acid
- ☐ Allopurinol
- ☐ Ferrous sulphate
- ☐ Aspirin
- ☐ Furosemide

Dr Assem

Tranexamic acid

4%

Allopurinol

77%

Ferrous sulphate

7%

Aspirin

7%

Furosemide

5%

Patients receiving CHOP for non-Hodgkin's lymphoma are at particular risk of tumour lysis syndrome and associated gout secondary to hyperuricaemia. Allopurinol is therefore normally co-prescribed to reduce this risk.

A 62-year-old male was admitted with a 9 day history of a cough, productive of green sputum associated with shortness of breath. He describes no weight loss, but fever and sweats. He is orientated in time and place and states he develops anaphylaxis to penicillins. On examination he had coarse inspiratory crackles in the right base, percussion was resonant and no added wheeze.

Observations: Respiratory rate 25 breaths per minute, saturation 86% on room air, blood pressure 110/90mmHg, heart rate 94 beats per minute.

Hb	12.2 g/dl
WCC	19.2 g/dl
Platelets	344 g/dl
Na+	139 mmol/l
K+	4.3 mmol/l
Urea	9.9 mmol/l
Creatinine	144 mmol/l
CRP	27 mg/l

Chest X-ray showed right lower zone radio-opacity with air bronchograms.

He was started on an antibiotic as per British thoracic society (BTS) guidelines.

What is the mechanism of action of that antibiotic?

- ☐ Reversible inhibition of 50s ribosome subunit
- ☐ Inhibits DNA gyrase
- ☐ Irreversible inhibition of 30s ribosome sub unit
- ☐ Dihydrofolate reductase inhibitor
- ☐ Dihydropteroate reductase inhibitor

Reversible inhibition of 50s ribosome subunit	47%
Inhibits DNA gyrase	16%
Irreversible inhibition of 30s ribosome sub unit	25%
Dihydrofolate reductase inhibitor	7%
Dihydropteroate reductase inhibitor	4%

This patient is likely suffering from a pneumonia with a CURB65 score of 1. As per BTS guidance the patient should be started on either Amoxicillin or Clarithromycin. The latter should be considered in light of his allergies.

Clarithromycin is a macrolide antibiotic with good gram positive cover and that of atypical organisms. Its mechanism of action is via reversible inhibition of 50s ribosome subunit.

A woman who is 24-weeks pregnant presents with a productive cough. On examination crackles can be heard in the left base and a decision is made to give an antibiotic. Which one of the following is least suitable to prescribe?

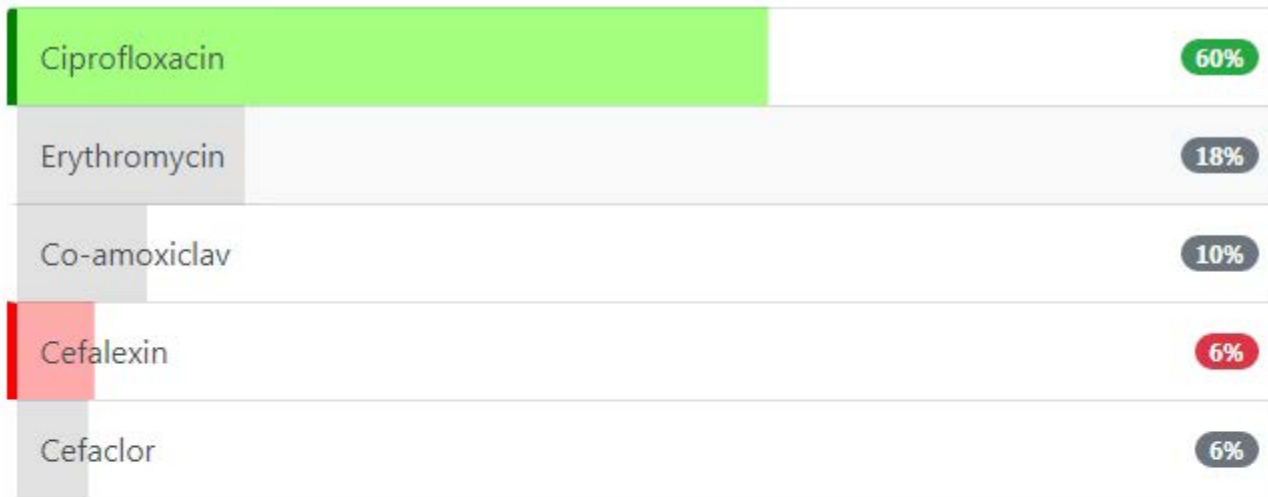
☐ Ciprofloxacin

☐ Erythromycin

☐ Co-amoxiclav

☐ Cefalexin

☐ Cefaclor



The BNF advises avoiding quinolones in pregnancy due to arthropathy in animal studies.

There have been some reports of an increased risk of necrotizing enterocolitis following the use of co-amoxiclav in pregnancy. The evidence is however inconclusive and the BNF states that co-amoxiclav is 'not known to be harmful'. A link is provided both to the BNF and the UK teratology information service.

A 34 year-old man presents to the Emergency Department after being rescued from a house fire. On examination he is short of breath, drowsy and confused, and complains of feeling dizzy with a worsening headache. He has no evidence of facial burns and no stridor. His observations show: blood pressure 110/82mmHg, heart rate 102bpm, oxygen saturations of 100% on air with a respiratory rate of 35/min. He appears markedly flushed but is afebrile. His venous blood gas results are shown below.

pH	7.28
pCO2	3.5 kPa
pO2	15.9 kPa
Na+	139 mmol/L
K+	4.5 mmol/L
Bicarbonate	11 mmol/L
Chloride	113 mmol/L
Lactate	13.6 mmol/L

In view of the likely diagnosis, what is the most appropriate intervention?

- ☐ Intubate and ventilate
- ☐ Intravenous hydroxocobalamin
- ☐ 15 litres of high-flow oxygen via face mask
- ☐ Intravenous dexamethasone
- ☐ Intravenous sodium nitroprusside

Dr Assem

Intubate and ventilate

16%

Intravenous hydroxocobalamin

34%

15 litres of high-flow oxygen via face mask

34%

Intravenous dexamethasone

6%

Intravenous sodium nitroprusside

9%

This man has developed acute cyanide toxicity secondary to burning plastics in the house fire. Cyanide ions inhibit mitochondrial cytochrome oxidase, preventing aerobic respiration. This manifests in normal oxygen saturations, a high pO_2 and flushing (or 'brick red' skin) brought on by the excess oxygenation of venous blood. In the question above it is important to note that the blood gas sample given is venous rather than arterial. His blood gas also demonstrates a increased anion gap, consistent with his high lactate (generated by anaerobic respiration due to the inability to use available oxygen).

The recommended treatment for moderate cyanide toxicity in the UK is one of three options: sodium thiosulfate, hydroxocobalamin or dicobalt edetate. Although any one of these may be used, the only option given is that of hydroxocobalamin and this is therefore the correct answer. Hydroxocobalamin additionally has the best side-effect profile and speed of onset compared with other treatments for cyanide poisoning.

Intubation would be appropriate treatment in the context of airway burns but this patient has no evidence of these, although close monitoring would be advised. High-flow oxygen is the treatment for carbon monoxide poisoning - a sensible differential, but this man's very high lactate and high venous pO_2 fit better with cyanide toxicity. Intravenous dexamethasone would be another treatment for airway oedema once a endotracheal tube had been placed. Intravenous sodium nitroprusside is a treatment for high blood pressure that can cause cyanide poisoning, and would therefore be inappropriate.



Discuss (7)

Improve

Dr Assem

Each of the following are true regarding tricyclic overdose, except:

- Anticholinergic features are prominent early on
- Metabolic acidosis is a common complication
- ECG changes include prolongation of the QT interval
- Dialysis is indicated in severe toxicity
- QRS duration > 160ms is associated with ventricular arrhythmias

Each of the following are true regarding tricyclic overdose, except:

Anticholinergic features are prominent early on

18%

Metabolic acidosis is a common complication

15%

ECG changes include prolongation of the QT interval

10%

Dialysis is indicated in severe toxicity

45%

QRS duration > 160ms is associated with ventricular arrhythmias

12%

What is the mechanism of action of ciclosporin?

- ☐ Monoclonal antibody against IL-2 receptor
- ☐ Interferes with purine synthesis
- ☐ IL-1 receptor decoy
- ☐ Decreases IL-2 release by inhibiting calcineurin
- ☐ Mercaptopurine antagonist

Monoclonal antibody against IL-2 receptor

9%

Interferes with purine synthesis

9%

IL-1 receptor decoy

5%

Decreases IL-2 release by inhibiting calcineurin

73%

Mercaptopurine antagonist

4%

Ciclosporin + tacrolimus: inhibit calcineurin thus decreasing IL-2

Important for me

Less important

A 24-year-old woman is admitted to hospital after presenting with a paracetamol overdose. She reported taking 30 paracetamol tablets around 10 hours ago. Treatment with acetylcysteine was commenced straight away following admission. She has grade II encephalopathy on examination. Around 24 hours after admission her bloods are repeated. Which one of the following findings is associated with the worst prognosis?

- ☐ Arterial pH of 7.37
- ☐ Bilirubin of 152 $\mu\text{mol/l}$
- ☐ Creatinine of 323 $\mu\text{mol/l}$
- ☐ Prothrombin time of 35 seconds
- ☐ ALT of 2,687 u/l

Arterial pH of 7.37

8%

Bilirubin of 152 $\mu\text{mol/l}$

5%

Creatinine of 323 $\mu\text{mol/l}$

44%

Prothrombin time of 35 seconds

31%

ALT of 2,687 u/l

13%

A creatinine as high as 323 $\mu\text{mol/l}$ is marker of poor prognosis and one of the criteria for a liver transplant.

A 65-year-old man with a history of type 2 diabetes mellitus and ischaemic heart disease presents with erectile dysfunction. It is decided to try sildenafil therapy. Which one of the following existing medications may be continued without making any adjustments?

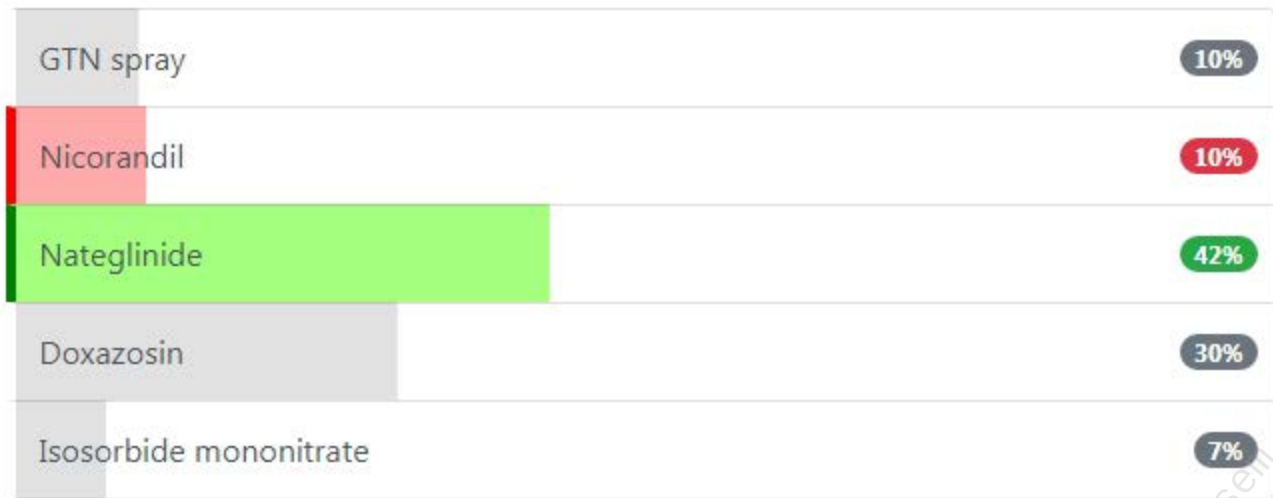
☐ GTN spray

☐ Nicorandil

☐ Nateglinide

☐ Doxazosin

☐ Isosorbide mononitrate



The BNF recommends avoiding alpha-blockers for 4 hours after sildenafil

A 14-year-old boy is brought to the Emergency Department. Whilst in school he injected his friends EpiPen into the palm of his left hand. Shortly afterwards the left middle finger became cold and pale. The capillary refill time was around 5-6 seconds. What is the most appropriate management?

- ☐ Inhalation of Nitrox (mixture of nitrogen + oxygen)
- ☐ Intravenous nitrate infusion
- ☐ Local infiltration of histamine
- ☐ Intravenous prostacyclin infusion
- ☐ Local infiltration of phentolamine

Inhalation of Nitrox (mixture of nitrogen + oxygen)

10%

Intravenous nitrate infusion

15%

Local infiltration of histamine

9%

Intravenous prostacyclin infusion

13%

Local infiltration of phentolamine

53%

Adrenaline induced ischaemia - phentolamine

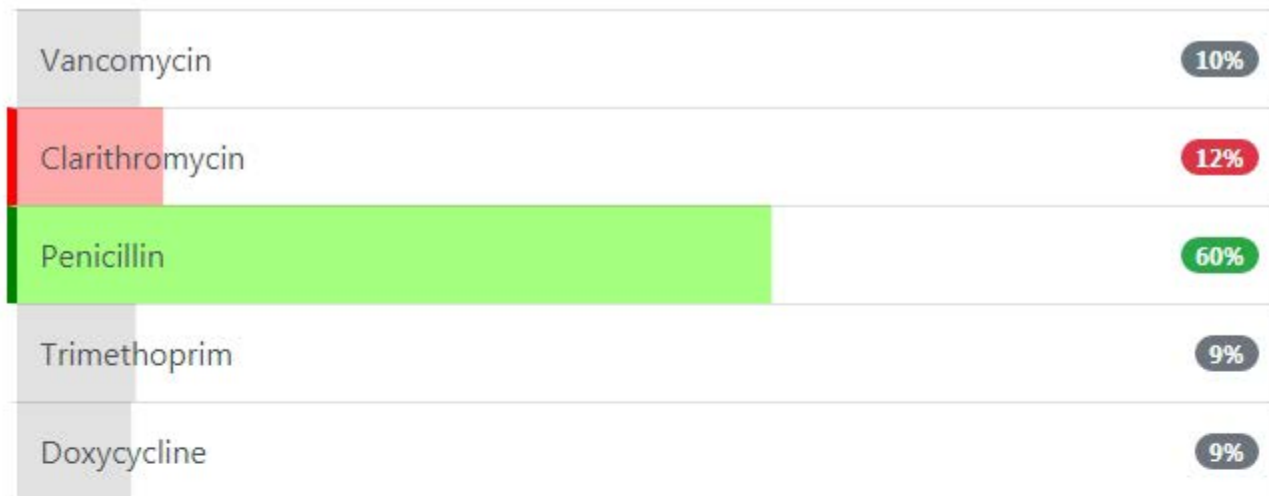
Important for me Less important

Phentolamine, a short acting alpha blocker, may be used in this situation. It is normally used mainly to control blood pressure during surgical resection of phaeochromocytoma

A 42-year-old male patient presents to the urgent care centre with a 4-hour history of rapidly evolving rash. He reports the rash started on the abdomen and has not spread to his back and the chest. The rash is itchy and angry-looking. He denies any facial and oral swelling. He reports that he was only started on a course of antibiotics by his GP for a chest infection and took the first dose an hour before the onset of the rash. On examination, there is an extensive erythematous rash with wheals on the abdomen, back and chest.

Which antibiotic has he most likely been started on?

- ☐ Vancomycin
- ☐ Clarithromycin
- ☐ Penicillin
- ☐ Trimethoprim
- ☐ Doxycycline



Penicillin is a common cause of urticaria

Important for me Less important

Penicillin is the most common antibiotic that can cause urticaria. The other antibiotics can all cause an allergic reaction manifesting in urticaria but not as common as penicillin. Given the history of chest infection, penicillin is most likely the antibiotic that was given.

Vancomycin is not usually given for community-acquired pneumonia

Trimethoprim is usually used for urinary tract infections.

Doxycycline can cause urticaria but it does so not as commonly as penicillin. The question is asking which antibiotic is most likely.

Dr. Arsem

What is the mechanism of action of rifampicin?

- ☐ Inhibits DNA synthesis
- ☐ Interferes with cell wall formation
- ☐ Inhibits RNA synthesis
- ☐ Causes misreading of mRNA
- ☐ Inhibits protein synthesis

Inhibits DNA synthesis

10%

Interferes with cell wall formation

6%

Inhibits RNA synthesis

70%

Causes misreading of mRNA

7%

Inhibits protein synthesis

7%

Rifampicin - inhibits RNA synthesis

Important for me Less important

A 55-year-old female is admitted following an overdose of amitriptyline. On examination she has dilated pupils and is tachycardic at 145 bpm, with a blood pressure of 102/56 mmHg. ECG reveals a broad complex tachycardia. Her GCS is 9/15 (M5, V2, E2). What is the most appropriate management?

- ☐ IV amiodarone
- ☐ IV bicarbonate
- ☐ IV magnesium
- ☐ DC cardioversion
- ☐ Glucagon

IV amiodarone	10%
IV bicarbonate	56%
IV magnesium	13%
DC cardioversion	16%
Glucagon	6%

Tricyclic overdose - give IV bicarbonate

Important for me Less important

Arrhythmias following tricyclic overdose are difficult to treat as many commonly used anti-arrhythmics are contraindicated. The use of sodium bicarbonate has been shown to be effective, even in patients who are not acidotic

A 48-year-old woman with longstanding rheumatoid arthritis is started on hydroxychloroquine. She has been on methotrexate monotherapy for 1 year and continues to have frequent flares. She undergoes 12 weekly FBC, U&E & LFTs.

In the long-term, which additional monitoring is required?

- ☐ Blood pressure
- ☐ Urinalysis
- ☐ Eye assessment
- ☐ Therapeutic levels
- ☐ Anti-histone antibodies

Urinalysis

9%

Eye assessment

65%

Therapeutic levels

7%

Anti-histone antibodies

9%

Hydroxychloroquine can cause retinopathy

Important for me Less important

Patients on longterm hydroxychloroquine require annual eye assessments as there is a risk of retinopathy. Other important drug causes of retinopathy include ethambutol, vigabatrin and amiodarone.

Blood pressure measurement is important in ciclosporin therapy. Urinalysis is required for gold and penicillamine (for protein due to the risk of membranous glomerulonephritis) and cyclophosphamide (for blood due to the risk of haemorrhagic cystitis and bladder cancer).

No drug requires routine monitoring of anti-histone antibodies (although penicillamine can cause drug-induced lupus) and therapeutic levels are required for the calcineurin inhibitors ciclosporin and tacrolimus.

NICE provide an excellent summary here: <https://cks.nice.org.uk/dmards#!management>

Which one of the following statements regarding drug metabolism is **incorrect**?

- ☐ Reduction is an example of a phase I reaction
- ☐ The majority of both phase I and phase II reactions take place in the liver
- ☐ Aspirin undergoes extensive first-pass metabolism
- ☐ Products of phase I reactions are typically more lipid soluble
- ☐ Products of phase II reactions are typically inactive and excreted in urine or bile

Reduction is an example of a phase I reaction

10%

The majority of both phase I and phase II reactions take place in the liver

12%

Aspirin undergoes extensive first-pass metabolism

20%

Products of phase I reactions are typically more lipid soluble

44%

Products of phase II reactions are typically inactive and excreted in urine or bile

14%

Usually both phase I and II reactions decrease lipid solubility

A 19-year-old student is admitted after being found friends confused and sweating in her room. She is unable to give a history. On examination temperature is 38.1°C, pulse 108/min, BP 130/70 mmHg and respiratory rate 30/min. Heart sounds are normal but she has bibasal fine inspiratory crackles on her chest.

ABGs on air:

pH	7.28
pCO2	2.8 kPa
pO2	14.2 kPa

What is the most likely diagnosis?

- ☐ Paracetamol overdose
- ☐ Acute pancreatitis
- ☐ Mycoplasma septicaemia
- ☐ Legionella pneumonia
- ☐ Aspirin overdose



The mixed respiratory alkalosis and metabolic acidosis in a sweaty, confused patient point towards salicylate overdose. The development of pulmonary oedema suggests severe poisoning and is an indication for haemodialysis

A 19-year-old man presents to the Emergency Department 5 hours ingesting 20g of paracetamol. N-acetyl cysteine is started straight away. What is the mechanism of action of N-acetyl cysteine?

- ☐ Replenishes glutathione
- ☐ Inhibits P450 mixed function oxidases
- ☐ Replenishes glucuronic acid
- ☐ Promotes formation of N-acetyl-B-benzoquinone imine
- ☐ Neutralises mercapturic acid

Replenishes glutathione

62%

Inhibits P450 mixed function oxidases

7%

Replenishes glucuronic acid

11%

Promotes formation of N-acetyl-B-benzoquinone imine

13%

Neutralises mercapturic acid

7%

Dobutamine is an example of:

- ☐ Alpha-1 agonist
- ☐ Alpha-2 agonist
- ☐ Beta-1 antagonist
- ☐ Beta-2 antagonist
- ☐ Beta-1 agonist

Alpha-1 agonist

21%

Alpha-2 agonist

18%

Beta-1 antagonist

11%

Beta-2 antagonist

9%

Beta-1 agonist

41%

A 29-year-old man comes to the gastroenterology clinic for review for his Crohn's disease. He has a 2-year history of an anal fistula which has been treated with a metronidazole, azathioprine and seton placements, but none of which has been effective. Following discussion with the consultant, you plan to start the patient on infliximab.

What is the mechanism of action of this medication?

- ☐ Anti-CD 20 antibody
- ☐ Anti-CD 52 antibody
- ☐ Anti -TNF monoclonal antibody
- ☐ EGFR inhibitor
- ☐ Anti-CD 4 antibody

Anti-CD 20 antibody

13%

Anti-CD 52 antibody

5%

Anti -TNF monoclonal antibody

75%

EGFR inhibitor

3%

Anti-CD 4 antibody

3%

Infliximab is an anti-TNF monoclonal antibody used in the treatment of Crohn's disease

Important for me [Less important](#)

Infliximab is an anti-TNF monoclonal antibody used in the treatment of Crohn's disease.

An example of anti-CD 20 antibody is rituximab.

An example of anti-CD 52 antibody is alemtuzumab.

An example of EGFR inhibitor is cetuximab.

An example of anti-CD4 antibody is cedelizumab.

A 65-year-old female is admitted to the Emergency Department following an overdose of a long-acting propranolol preparation. On admission she is bradycardic with a pulse of 36/min and BP 90/50. The bradycardia fails to respond to atropine. What is the most appropriate management?

☐ Temporary cardiac pacing

☐ Haemodialysis

☐ Glucagon

☐ Noradrenaline infusion

☐ Salbutamol infusion

Temporary cardiac pacing

22%

Haemodialysis

5%

Glucagon

61%

Noradrenaline infusion

8%

Salbutamol infusion

4%

Beta-blocker overdose management: atropine + glucagon

Important for me Less important

Glucagon has a positive inotropic action on the heart and decreases renal vascular resistance. It is therefore useful in patients with beta-blocker cardiotoxicity. Cardiac pacing should be reserved for patients unresponsive to pharmacological therapy.

A confused 45-year-old man is admitted to the Emergency Department. He tells staff he has drunk two bottles of antifreeze. On examination his pulse is 120 bpm and blood pressure is 140/90 mmHg. Arterial blood gases show an uncompensated metabolic acidosis. He is transferred to the high dependency unit and ethanol is given via a nasogastric tube. What is the mechanism of action of ethanol in this patient?

- ☐ Binds to glycolic acid
- ☐ Inhibits aldehyde dehydrogenase
- ☐ Inhibits alcohol dehydrogenase
- ☐ Competes with ethylene glycol for alcohol dehydrogenase
- ☐ Binds to glycoaldehyde

Binds to glycolic acid

4%

Inhibits aldehyde dehydrogenase

8%

Inhibits alcohol dehydrogenase

18%

Competes with ethylene glycol for alcohol dehydrogenase

68%

Binds to glycoaldehyde

3%

Dr Arsem

A 45-year-old female is admitted to the burns unit following being involved in a house fire. She is hypoxic, hypotensive and has flushed red skin. You suspect cyanide toxicity and treat her with intravenous hydroxocobalamin.

What is the mechanism of cyanide toxicity?

- ☐ Inhibits the mitochondrial enzyme cytochrome c oxidase
- ☐ Carboxyhemoglobinemia
- ☐ Methemoglobinemia
- ☐ Depletion of glutathione stores
- ☐ Competitive inhibition of the enzyme alcohol dehydrogenase

Inhibits the mitochondrial enzyme cytochrome c oxidase

57%

Carboxyhemoglobinemia

15%

Methemoglobinemia

14%

Depletion of glutathione stores

7%

Competitive inhibition of the enzyme alcohol dehydrogenase

6%

Cyanide inhibits the enzyme cytochrome c oxidase, resulting in cessation of the mitochondrial electron transfer chain

Important for me [Less important](#)

Fires involving the burning of plastics can result in cyanide toxicity. Cyanide inhibits the enzyme cytochrome c oxidase, resulting in cessation of the the mitochondrial electron transfer chain. This causes histotoxic hypoxia because the cells of an organism are unable to create ATP.

Carboxyhemoglobinemia is a feature of carbon monoxide poisoning. Exposure to small concentrations of CO hinder the ability of Hb to deliver oxygen to the body, because carboxyhemoglobin forms more readily than oxyhaemoglobin.

Methemoglobinemia is a form of haemoglobin that contains the ferric $[Fe^{3+}]$ form of iron. The affinity for oxygen of the ferric iron is impaired resulting in tissue hypoxia. It can occur to genetic or acquired forms (e.g. the use of drugs such as amyl nitrite).

Depletion of glutathione stores occurs in paracetamol toxicity.

Fomepizole is a competitive inhibitor of the enzyme alcohol dehydrogenase and can be used to treat methanol and ethylene glycol toxicity.

A 45-year-old man presents to the Emergency Department stating he has drunk a bottle of antifreeze. Which one of the following features are least associated with this kind of poisoning?

- ☐ Metabolic acidosis with high anion gap
- ☐ Acute renal failure
- ☐ Hypertension
- ☐ Confusion
- ☐ Loss of vision

A 45-year-old man presents to the Emergency Department stating he has drunk a bottle of antifreeze. Which one of the following features are least associated with this kind of poisoning?

Metabolic acidosis with high anion gap

13%

Acute renal failure

5%

Hypertension

30%

Confusion

4%

Loss of vision

48%

Loss of vision is seen in methanol rather than ethylene glycol poisoning

Dr Assef

Which one of the following statements regarding amiodarone-induced thyrotoxicosis (AIT) is correct?

- ☐ AIT type 2 should be treated with corticosteroids
- ☐ Amiodarone should be continued in the majority of patients
- ☐ Carbimazole is contraindicated in AIT type 1
- ☐ Goitre is usually present in AIT type 2
- ☐ AIT type 1 is due to a amiodarone-related destructive thyroiditis

AIT type 2 should be treated with corticosteroids

41%

Amiodarone should be continued in the majority of patients

19%

Carbimazole is contraindicated in AIT type 1

9%

Goitre is usually present in AIT type 2

9%

AIT type 1 is due to a amiodarone-related destructive thyroiditis

22%

A 66-year-old woman with a history of chronic kidney disease stage disease 4 metastatic breast cancer is admitted with a swollen right calf. Investigations confirm a deep vein thrombosis and she is started on treatment dose dalteparin. As she has a significant degree of renal impairment it is decided to monitor her response to dalteparin. What is the most appropriate blood test to perform?

- ☐ Anti-Factor Xa levels
- ☐ Antithrombin III levels
- ☐ Anti-Factor VIIIa levels
- ☐ Prothrombin time (PT)
- ☐ Activated Partial Thromboplastin Time (APTT)

Anti-Factor Xa levels

50%

Antithrombin III levels

13%

Anti-Factor VIIIa levels

4%

Protrombin time (PT)

10%

Activated Partial Thromboplastin Time (APTT)

23%

Thrombocytopenia is associated with each of the following drugs except:

☐ Abciximab

☐ Quinine

☐ Warfarin

☐ Penicillin

☐ Sodium valproate

Abciximab

9%

Quinine

9%

Warfarin

49%

Penicillin

24%

Sodium valproate

10%

A 55-year-old female presents to the Emergency Department with a deliberate overdose of amitriptyline. Paramedics report that a box of thirty 50mg tablets was found empty by her bed. On examination, she appears a little lethargic however there is no focal neurological abnormality. Observations show heart rate 110/min, blood pressure 105/75mmHg. An ECG shows a sinus tachycardia with a QRS duration of 135ms and a corrected QT interval of 390ms. What is the most appropriate initial management of this patient?

- ☐ Intravenous isotonic saline
- ☐ Intravenous glucagon
- ☐ Intravenous lipid emulsion
- ☐ Intravenous sodium bicarbonate
- ☐ Intravenous magnesium sulphate

Intravenous isotonic saline	12%
Intravenous glucagon	6%
Intravenous lipid emulsion	7%
Intravenous sodium bicarbonate	63%
Intravenous magnesium sulphate	12%

Intravenous sodium bicarbonate is the standard initial therapy for patients who develop cardiotoxicity (usually a QRS > 100ms or a ventricular arrhythmia) as a result of tricyclic antidepressant (TCA) overdose.

Intravenous magnesium sulphate can be used as a second-line agent in refractory arrhythmias.

Intravenous lipid emulsion is an emerging therapy for overdose of lipophilic compounds. It may have a role in overdoses of verapamil, beta blockers, and some TCAs. However it is not an appropriate first line agent.

Intravenous glucagon is used in beta blocker overdose.

Intravenous isotonic saline is indicated in a hypotensive patient.

Which one of the following is an absolute contraindication to combined oral contraceptive pill use?

- ☐ Controlled hypertension
- ☐ History of cholestasis
- ☐ Women more than 35 years old and smoking more than 15 cigarettes/day
- ☐ BMI of 38 kg/m^2
- ☐ Migraine without aura

Controlled hypertension

5%

History of cholestasis

8%

Women more than 35 years old and smoking more than 15 cigarettes/day

55%

BMI of 38 kg/m²

13%

Migraine without aura

19%

Which one of the following drugs cannot be cleared by haemodialysis?

- ☐ Aspirin
- ☐ Tricyclics
- ☐ Lithium
- ☐ Barbiturates
- ☐ Aminophylline

Aspirin

9%

Tricyclics

64%

Lithium

8%

Barbiturates

8%

Aminophylline

11%

A 45-year-old man presents with pain and swelling of his left big toe. He has recently started treatment for active tuberculosis. Which one of the following medications is likely to be responsible?

☐ Streptomycin

☐ Rifampicin

☐ Ethambutol

☐ Isoniazid

☐ Pyrazinamide



There are case reports of ethambutol-induced gout but it is not listed as a side-effect in the BNF

Which one of the following drugs causes shortening of the QT interval?

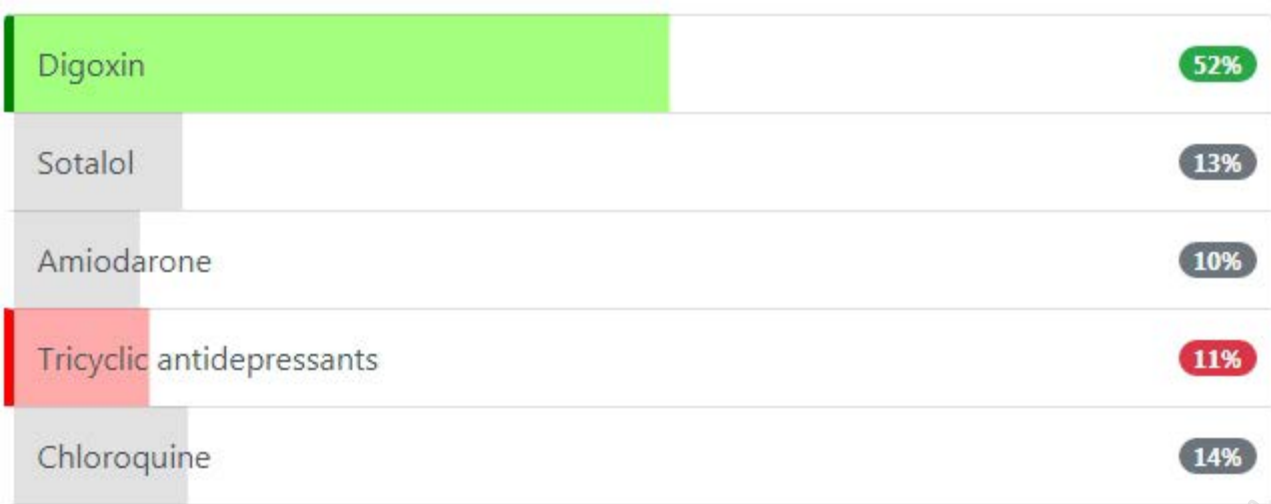
☐ Digoxin

☒ Sotalol

☐ Amiodarone

☐ Tricyclic antidepressants

☐ Chloroquine



Digoxin causes shortening of the QT interval whilst the other four drugs cause QT prolongation

A 79-year-old male patient presents to the GP surgery with a 1-month history of constipation. He reports that a month ago, he used to open his bowels once a day every morning, but for the last month, he was only able to open bowels once every 3 days at best and each time the bowel was opened, the stool is very dry and lumpy and he has to strain a lot on the toilet. He is very distressed by this. You notice that he was started on a medication one month ago and you suspect that this might have contributed to his constipation.

Which is the most likely medication he was started on?

- ☐ Bisoprolol
- ☐ Verapamil
- ☐ Metformin
- ☐ Warfarin
- ☐ Aspirin

Bisoprolol	16%
Verapamil	57%
Metformin	17%
Warfarin	5%
Aspirin	5%

Verapamil commonly causes constipation

Important for me Less important

Verapamil, a calcium channel blocker, is a common cause of constipation. Even though many medications can cause constipation, verapamil is the most likely medication amongst the options given.

Bisoprolol can cause constipation but not as commonly as verapamil.

Metformin, warfarin and aspirin do not usually cause constipation.

A 54-year-old man with a history of hypertension comes for review. He currently takes lisinopril 10mg od, simvastatin 40mg on and aspirin 75mg od. His blood pressure is well controlled at 124/76 mmHg but he also mentions that he is due to have a tooth extraction next week. What advice should be given with regards to his aspirin use?

- ☐ Take aspirin as normal but take tranexamic 1g tds acid 24 hours before and after procedure
- ☐ Stop 72 hours before, restart 24 hours after procedure
- ☐ Stop 24 hours before, restart 12 hours after procedure
- ☐ Take aspirin as normal
- ☐ Stop 48 hours before, restart 24 hours after procedure

Take aspirin as normal but take tranexamic 1g tds acid 24 hours before and after procedure	5%
Stop 72 hours before, restart 24 hours after procedure	15%
Stop 24 hours before, restart 12 hours after procedure	10%
Take aspirin as normal	61%
Stop 48 hours before, restart 24 hours after procedure	9%

In the BNF section 'Prescribing in dental practice' it advises that patients in this situation should continue taking anti-platelets as normal

In the Vaughan Williams classification of antiarrhythmics lidocaine is an example of a:

- ☐ Class Ia agent
- ☐ Class Ib agent
- ☐ Class Ic agent
- ☐ Class II agent
- ☐ Class IV agent

Class Ia agent

19%

Class Ib agent

46%

Class Ic agent

18%

Class II agent

9%

Class IV agent

8%

A 52-year-old homeless man is admitted with suspected ethylene glycol toxicity. Following admission to the High Dependency Unit it is decided to give fomepizole. What is the mechanism of action of fomepizole?

- ☐ Competitive inhibitor of aldehyde dehydrogenase
- ☐ Binds to glycoaldehyde
- ☐ Binds to glycolic acid
- ☐ Promotes renal excretion of ethylene glycol
- ☐ Competitive inhibitor of alcohol dehydrogenase

Competitive inhibitor of aldehyde dehydrogenase

23%

Binds to glycoaldehyde

5%

Binds to glycolic acid

4%

Promotes renal excretion of ethylene glycol

7%

Competitive inhibitor of alcohol dehydrogenase

61%

A 40-year-old woman who is known to be HIV positive is reviewed in the respiratory clinic. She has recently started treatment for tuberculosis and is complaining of a loss of sensation in her hands. Which one of the following drugs is most likely to be responsible?

- ☐ Indinavir
- ☐ Pyrazinamide
- ☐ Zidovudine
- ☐ Streptomycin
- ☐ Isoniazid

Indinavir

4%

Pyrazinamide

14%

Zidovudine

6%

Streptomycin

4%

Isoniazid

72%

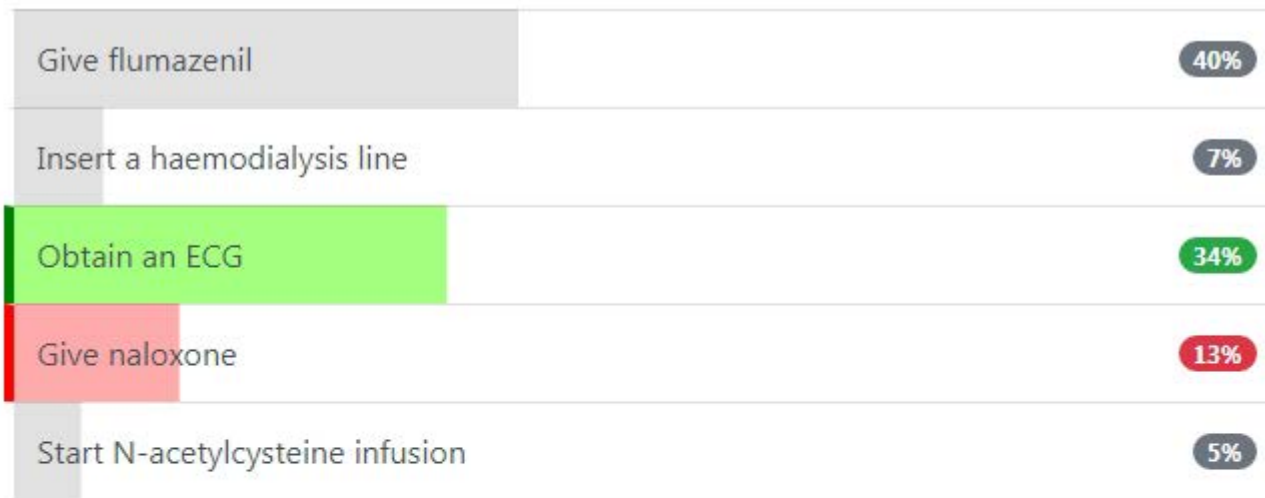
Isoniazid causes peripheral neuropathy

Important for me

Less important

A 34-year-old man with a history of depression is admitted to the Emergency Department. He states he has taken an overdose of both diazepam and dosulepin. On examination blood pressure is 116/78 and the pulse is 140 bpm. His respiratory rate is 8 per minute and the oxygen saturations are 97% on room air. What is the most appropriate next course of action?

- ☐ Give flumazenil
- ☐ Insert a haemodialysis line
- ☐ Obtain an ECG
- ☐ Give naloxone
- ☐ Start N-acetylcysteine infusion



As this patient has a marked tachycardia the first step would be to obtain an ECG. If changes such as QRS widening are seen then intravenous bicarbonate should be given

Some users have argued that an 'ABC' approach should be taken, with flumazenil given to reverse the respiratory depression. The potential risk of doing this would be inducing a seizure given the coexistent tricyclic overdose

A 37-year-old woman with a history of type 2 diabetes mellitus and obesity presents after a late period. The urinary hCG test is positive. Her current medication is as follows:

Orlistat 120mg tds
Simvastatin 40mg on
Aspirin 75mg od
Metformin 1g bd
Paracetamol 1g qds
Aqueous cream prn

Which one of her medications must be stopped straight away?

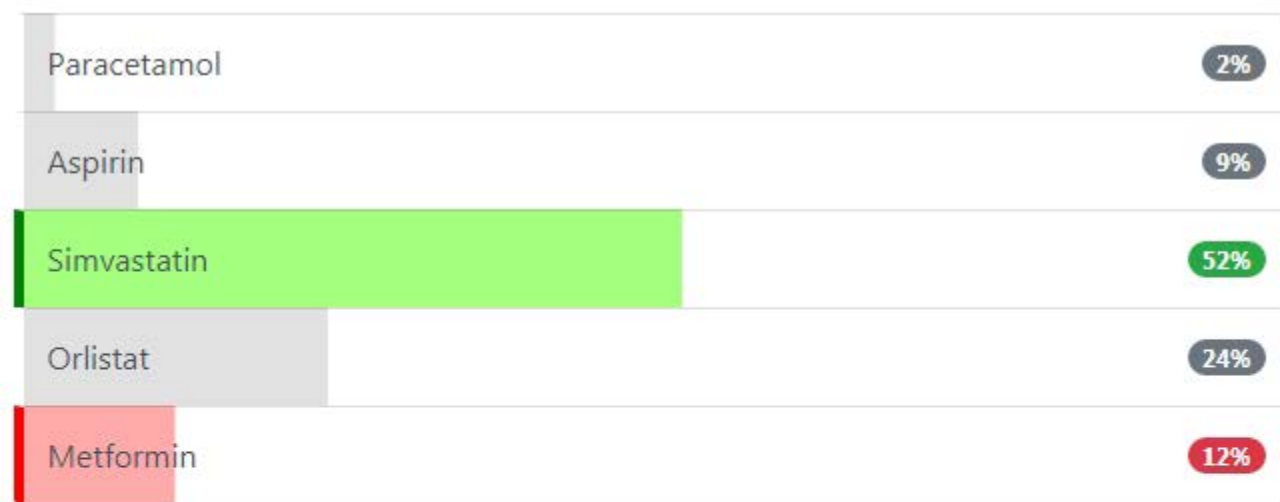
☐ Paracetamol

☐ Aspirin

☐ Simvastatin

☐ Orlistat

☐ Metformin



Simvastatin is contraindicated in pregnancy and must be stopped immediately. Metformin is sometimes used in pregnancy although many diabetic women are converted to insulin for the duration of the pregnancy to try and maximise control and minimise complications.

Whilst orlistat is not a known teratogen it should be used with 'caution' in pregnancy according to the BNF and the benefits are very likely outweighed by risks.

A 65-year-old man is rushed to the emergency department by his daughter. He complains of crushing, central chest pain.

An immediate ECG trace of his heart shows widespread ST elevation in the anterolateral chest leads.

He is started on aspirin, prasugrel, morphine, metoclopramide and nitrates and is taken to the percutaneous coronary intervention (PCI) lab. The cardiologist attending suggests starting him on abciximab for the prevention of further ischemic events.

What is the mechanism of action of the drug suggested by the cardiologist?

- ☐ Direct factor X inhibitor
- ☐ Direct thrombin inhibitor
- ☐ P2Y₁₂ inhibitor
- ☐ Activates anti-thrombin III
- ☐ Glycoprotein IIb/IIIa inhibitor

Direct factor X inhibitor

7%

Direct thrombin inhibitor

6%

P2Y₁₂ inhibitor

9%

Activates anti-thrombin III

5%

Glycoprotein IIb/IIIa inhibitor

73%

Abciximab is a glycoprotein IIb/IIIa receptor antagonist

Important for me [Less important](#)

Drug name	MOA
Heparin	activates anti-thrombin III
Prasugrel	P2Y ₁₂ ADP inhibitor
Abciximab	glycoprotein IIb/IIIa inhibitor
Dabigatran	direct thrombin inhibitor
Rivaroxaban	direct factor X inhibitor

Dr Assem

A 45-year-old man with a history of epilepsy and psychiatric problems is admitted to the Emergency Department with confusion following a seizure earlier in the day. On examination he is noted to have a coarse tremor, blood pressure is 134/86 mmHg, pulse is 84/min and the temperature is 36.7°C. What is the most likely diagnosis?

- ☐ Carbamazepine overdose
- ☐ Lithium toxicity
- ☐ Benzodiazepine toxicity
- ☐ Tricyclic overdose
- ☐ Neuroleptic malignant syndrome

Carbamazepine overdose

12%

Lithium toxicity

47%

Benzodiazepine toxicity

12%

Tricyclic overdose

14%

Neuroleptic malignant syndrome

14%

Lithium: fine tremor in chronic treatment, coarse tremor in acute toxicity

Important for me Less important

A tricyclic overdose may present with seizures but it does not typical cause a tremor

A 74-year-old male presents to the surgical assessment unit. He has come in with lower abdominal pain and has been unable to pass urine for the past 12 hours. On examination he has a palpable bladder and is tender in the suprapubic region. On PR examination his prostate is smooth and not enlarged. He has a background of high blood pressure, depression, neuropathic pain and diabetes.

What is the most likely cause for this presentation?

- ☐ Gabapentin
- ☐ Amlodipine
- ☐ Metformin
- ☐ Amitriptyline
- ☐ BPH



Amitriptyline can cause urinary retention

Important for me Less important

This gentleman is in urinary retention. Amitriptyline can cause urinary retention through its anticholinergic activity.

The other medications do not cause urinary retention.

The patient has a small prostate on PR examination so is unlikely to be suffering from BPH

A 56-year-old female with a history of depression is brought in to the Emergency Department by a concerned neighbour. Beside the patient are empty blister packets of co-codamol 30/500, indicating that she may have taken up to 50 tablets. She is confused with a GCS of 14/15 and is unable to say when she took the tablets. What is the most appropriate initial management?

- ☐ Start N-acetyl cysteine immediately
- ☐ Immediate referral for haemodialysis
- ☐ Give naloxone
- ☐ Start N-acetyl cysteine 4 hours after presentation if levels are elevated
- ☐ Observe

Start N-acetyl cysteine immediately	67%
Immediate referral for haemodialysis	7%
Give naloxone	14%
Start N-acetyl cysteine 4 hours after presentation if levels are elevated	6%
Observe	6%

She may have consumed 25g of paracetamol which is a life-threatening overdose. N-acetyl cysteine needs to be commenced immediately.

There is no mention in the question of respiratory depression or hypoxia to justify the use of naloxone

A 45-year-old female with a history of bipolar disorder presents with an acute confusional state. Which one of the following drugs is most likely to precipitate lithium toxicity?

- ☐ Sodium valproate
- ☐ Atenolol
- ☐ Aminophylline
- ☐ Sodium bicarbonate
- ☐ Bendroflumethiazide

Sodium valproate	14%
Atenolol	6%
Aminophylline	12%
Sodium bicarbonate	4%
Bendroflumethiazide	64%

Both sodium bicarbonate and aminophylline may reduce plasma concentrations of lithium. Sodium valproate is not listed in the BNF as interacting with lithium

A 20-year-old man is admitted to the Emergency Department with chest pain. He confides that he has snorted 'a large amount' of cocaine in the previous hours. Which one of the following features is his cocaine use most likely to cause?

- ☐ Hypokalaemia
- ☐ Hyperthermia
- ☐ Decreased deep tendon reflexes
- ☐ Hypotension
- ☐ Metabolic alkalosis

Hypokalaemia

10%

Hyperthermia

66%

Decreased deep tendon reflexes

7%

Hypotension

8%

Metabolic alkalosis

9%

Which of the following antibiotics act by inhibiting protein synthesis?

☐ Cephalosporins

☐ Gentamicin

☐ Rifampicin

☐ Trimethoprim

☐ Flucloxacillin

Cephalosporins

13%

Gentamicin

54%

Rifampicin

16%

Trimethoprim

11%

Flucloxacillin

6%

Aminoglycosides inhibit protein synthesis by acting on the 30S ribosomal unit

Important for me Less important

You are working in oncology. A 50-year-old patient with an adenocarcinoma of the lung (T3 N3 M1a) comes to clinic. He is an ex-smoker of 20 pack years. He has previously been treated with docetaxel and cisplatin which have unfortunately failed. He was subsequently tested for an EGFR gene mutation which was found to be negative. His performance status is 0. He asks you about a 'new agent' he has read about called nivolumab. How does this drug work?

- ☐ EGFR inhibitor
- ☐ VEGF inhibitor
- ☐ ALK-1 inhibitor
- ☐ PD-1 inhibitor
- ☐ CTLA-4 inhibitor



Immunotherapy is an area which is rapidly advancing in oncology and haematology and it is important clinicians are aware of these advancements. One area of immunotherapy that has developed in recent years is the emergence of checkpoint inhibitors.

Nivolumab is a PD-1 (programmed cell death) inhibitor. PD-1 receptors are found on the surface of T cells. When a T cell is alerted to a cancer cell the cancer cell can express the PD-L1 protein. This is a ligand which binds to the T cell receptor and deactivates it. It is therefore a mechanism cancer cells use to evade the immune system and disable T cells. The PD-1 inhibitors are antibodies which block this receptor, leaving the T cells to remain active and alert other immune cells for example macrophages to the cancer cells.

EGFR is the epidermal growth factor receptor. An example of an inhibitor used in lung cancer would be erlotinib (Tarceva).

VEGF inhibitors are vascular endothelial growth factor inhibitors. An example is bevacizumab which is used in colorectal cancer.

ALK-1 inhibitors are drugs that act on anaplastic lymphoma kinase (a tyrosine kinase). Crizotinib is an ALK-1 inhibitor which is undergoing further trials in NSCLC.

CTLA-4 (cytotoxic T-lymphocyte associated protein 4) is another immune checkpoint which down-regulates T cell responses. Blocking this with inhibitors such as ipilimumab again activates the immune system against cancer.

Nivolumab in combination with ipilimumab has shown encouraging results in patients with stage 4 metastatic melanoma and lymphoma. It is currently undergoing trials into many other solid malignancies such as lung, oesophageal and head and neck cancer.

A 60-year-old lady with atrial fibrillation and type 2 diabetes attends for DC Cardioversion. She has continued her usual medications and 2mg of intravenous diazepam are given for sedation. Her usual medications are aspirin, ramipril, bisoprolol and metformin. Following DC cardioversion she is found to be in sinus bradycardia with a heart rate of 29. Which reversal agent is most likely to correct her bradycardia?

- ☐ Intramuscular flumazenil
- ☐ Intramuscular glucagon
- ☐ Intravenous flumazenil
- ☐ Intravenous glucagon
- ☐ Intravenous amiodarone

Intramuscular flumazenil	7%
Intramuscular glucagon	20%
Intravenous flumazenil	24%
Intravenous glucagon	42%
Intravenous amiodarone	7%

Beta-blocker - atropine, glucagon in resistant cases

Important for me Less important

This lady's bradycardia is most likely to be caused by beta blockade from her bisoprolol.

The recommended reversal agent for bisoprolol is intravenous glucagon.

Atropine is likely to be appropriate based on Advanced Life Support treatment pathways to treat the bradycardia. The most likely reversal agent, however, would be intravenous glucagon.

Intramuscular glucagon may be used to treat hypoglycaemia, however is not appropriate for reversal of beta-blockade.

Flumazenil is not the correct answer, for although this would reverse any remaining sedation, it would not reverse the beta-blockade and bradycardia.

Amiodarone is not a reversal agent and thus not the correct answer.

Source: BNF

A patient presents to the Emergency Department following the development of an urticarial skin rash following the introduction of a new drug. Which one of the following is most likely to be responsible?

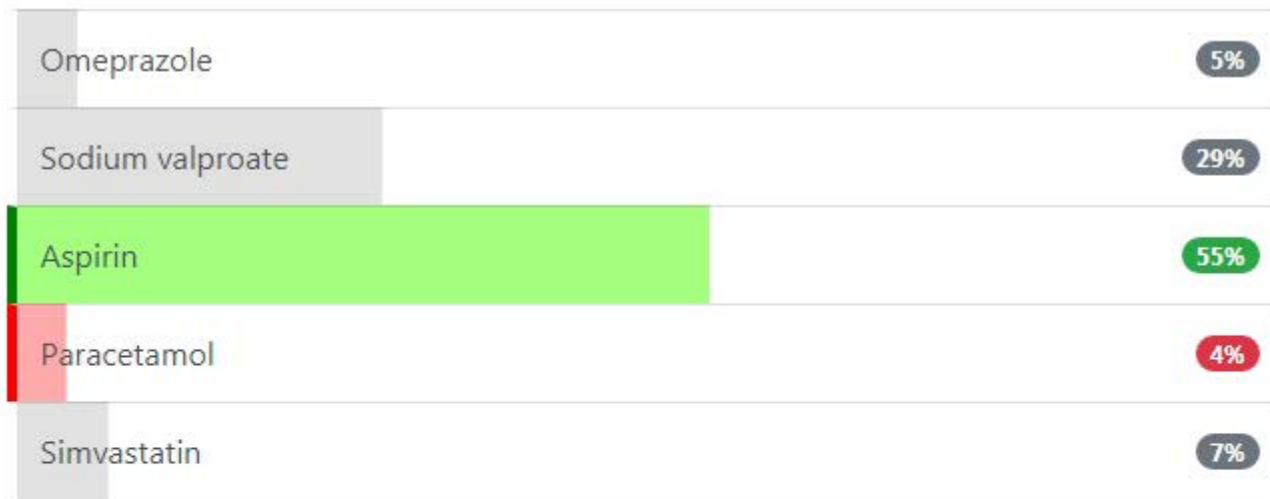
☐ Omeprazole

☐ Sodium valproate

☐ Aspirin

☐ Paracetamol

☐ Simvastatin



Aspirin is a common cause of urticaria

Important for me Less important

Although all medications can potentially cause urticaria it is commonly seen secondary to aspirin

A 62-year-old man is attends the emergency department in fast atrial fibrillation. He is successfully cardioverted after the failure of beta-blocker therapy. Upon discharge he is placed on flecainide by the cardiologist.

Which of the following best describes flecainide's mechanism of action?

- ☐ Blocking catecholamine stimulation of beta one adrenergic receptors in the heart
- ☐ Blocking the Nav1.5 sodium channels in the heart
- ☐ Blocking the batrachotoxin activated sodium channels of the heart
- ☐ Blocking the potassium, sodium and calcium channels of the heart
- ☐ Blocking the rectifier potassium current

Blocking catecholamine stimulation of beta one adrenergic receptors in the heart 6%

Blocking the Nav1.5 sodium channels in the heart 62%

Blocking the batrachotoxin activated sodium channels of the heart 9%

Blocking the potassium, sodium and calcium channels of the heart 13%

Blocking the rectifier potassium current 10%

Flecainide works by blocking the Nav1.5 sodium channel in the heart which slowing the upstroke of the cardiac action potential.

Bisoprolol works blocking the stimulation of beta one adrenergic receptors found mainly in the heart muscle which ultimately leads to decreased adrenergic tone and stimulation of the heart muscle.

Procainamide works in a similar way to flecainide but instead induces a rapid blocking of the batrachotoxin activated sodium channels rapidly.

Dronedarone's mechanism of action is unclear but it is believed to be involved in both the inhibition of outward potassium channels as well as the reduction of sodium into the cells. It is also thought to have an effect on the calcium channels.

Ibutilide works primarily by prolonging the repolarization in atrial and ventricular myocardium. This effect is caused by blocking IKr, the rapid component of the cardiac delayed rectifier potassium current.

A 35-year-old man with a known history of peanut allergy is admitted to the Emergency Department with a swollen face. On examination blood pressure is 85/60 mmHg, pulse 120 bpm and there is a bilateral expiratory wheeze. What is the most appropriate form of adrenaline to give?

☐ 10ml 1:10,000 IV

☐ 0.5ml 1:1,000 IM

☐ 0.5ml 1:10,000 IM

☐ 5ml 1:1,000 IM

☐ Nebulised adrenaline

10ml 1:10,000 IV

8%

0.5ml 1:1,000 IM

77%

0.5ml 1:10,000 IM

9%

5ml 1:1,000 IM

4%

Nebulised adrenaline

2%

Recommend Adult Life Support (ALS) adrenaline doses

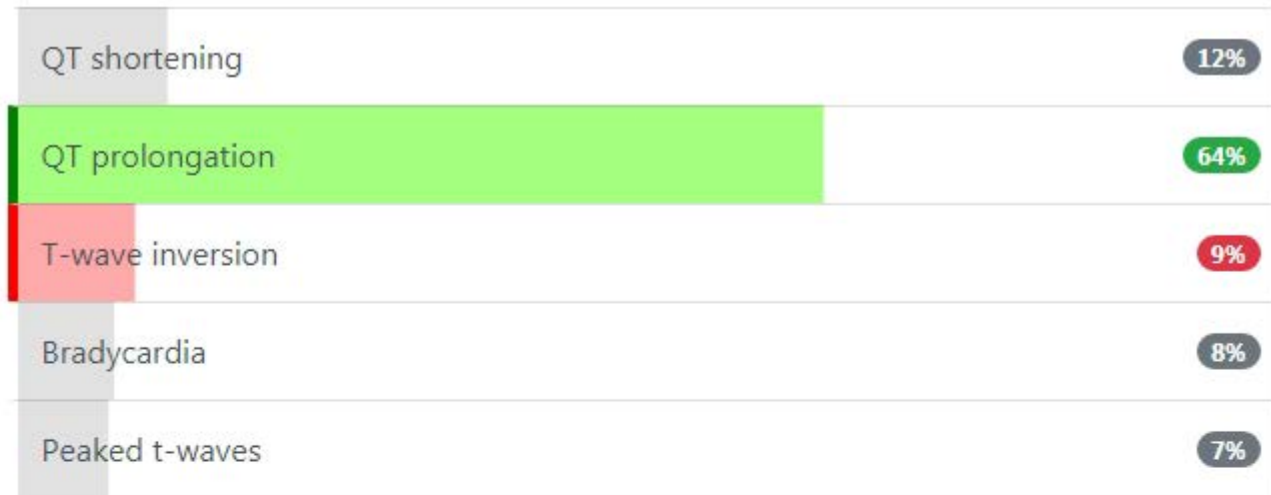
- anaphylaxis: 0.5ml 1:1,000 IM
- cardiac arrest: 10ml 1:10,000 IV or 1ml of 1:1000 IV

Important for me Less important

A 45-year-old patient presented with significant malnutrition and was initiated on nasogastric feeding. Refeeding blood tests noted a significant hypomagnesemia.

What ECG changes are most likely to be present?

- ☐ QT shortening
- ☐ QT prolongation
- ☐ T-wave inversion
- ☐ Bradycardia
- ☐ Peaked t-waves



The ECG change most typically associated with hypomagnesaemia is QT prolongation.

QT shortening is more typically seen with hypercalcaemia, congenital QT syndrome and digoxin.

T-wave inversion is more typically seen with coronary ischaemia or left ventricular hypertrophy.

Peaked t-waves are more typically seen with hypercalcaemia.

hypomagnesemia does not typically cause a bradycardia.

Which one of the following drugs demonstrates saturation pharmacokinetics?

☐ Enalapril

☐ Bendrofluazide

☐ Atenolol

☐ Phenytoin

☐ Paracetamol

Enalapril

4%

Bendrofluazide

7%

Atenolol

7%

Phenytoin

58%

Paracetamol

23%

Exhibits zero-order kinetics - phenytoin

Important for me

Less important

Which one of the following drugs does not characteristically undergo extensive first-pass metabolism?

- ☐ Propranolol
- ☐ Glyceryl trinitrate
- ☐ Diazepam
- ☐ Aspirin
- ☐ Verapamil

Propranolol

11%

Glyceryl trinitrate

19%

Diazepam

36%

Aspirin

22%

Verapamil

12%

A 45-year-old man is referred to the acute medical unit. He had presented earlier in the day to the GP complaining of ongoing fatigue and polydipsia. A BM (finger-prick glucose) taken in the surgery was 22.3 mmol/l. On examination he is an obese man (BMI 36kg/m²) with a pulse of 84 bpm and blood pressure of 144/84 mmHg. Blood tests reveal the following:

Na ⁺	140 mmol/l
K ⁺	3.9 mmol/l
Bicarbonate	23 mmol/l
Urea	5.2 mmol/l
Creatinine	101 mol/l
Glucose	21.2 mmol/l

You encourage him to lose weight and discuss basic dietary advice. What is the most appropriate initial management?

- ☐ Gliclazide
- ☐ Pioglitazone
- ☐ Exenatide
- ☐ Metformin
- ☐ Commence insulin therapy



Whilst there is a role for exenatide in obese patients it is not used first-line.

Tamsulosin is a:

- ☐ Alpha-1b agonist
- ☐ Alpha-1a agonist
- ☐ Non-selective alpha antagonist
- ☐ Alpha-1a antagonist
- ☐ Alpha-1b antagonist

Alpha-1b agonist

7%

Alpha-1a agonist

20%

Non-selective alpha antagonist

9%

Alpha-1a antagonist

52%

Alpha-1b antagonist

13%

Low molecular weight heparin has the greatest inhibitory effect on which one of the following proteins involved in the coagulation cascade?

☐ Factor IXa

☐ Factor XIa

☐ Factor Xa

☐ Thrombin

☐ Factor XIIa

Factor IXa

5%

Factor XIa

5%

Factor Xa

65%

Thrombin

19%

Factor XIIa

5%

A 70-year-old patient attends the GP with a 10-day history of increasing shortness of breath and ankle swelling. He has a past medical history of hypertension, type II diabetes, ischaemic heart disease and systolic heart failure. He was started on a new medication 10 days ago. Which of the below drugs is most likely to have caused his new symptoms?

☐ Bendroflumethiazide

☐ Pioglitazone

☐ Paracetamol

☐ Dapagliflozin

☐ Rivaroxaban

Bendroflumethiazide

10%

Pioglitazone

67%

Paracetamol

5%

Dapagliflozin

13%

Rivaroxaban

5%

Glitazones can cause fluid retention and decompensation of heart failure

Important for me Less important

The correct answer is pioglitazone. Glitazones are a class of anti-hypoglycaemics which can cause retention of fluid resulting in decompensation of pre-existing heart failure. Other medications which can cause worsening of heart failure include NSAIDs, non-dihydropyridine calcium channel blockers, non-cardio-selective beta blockers, some arrhythmic agents and alpha blockers used for urological problems.

BNF:
<https://bnf.nice.org.uk/drug/pioglitazone.html>

American College of Cardiology:
<http://www.acc.org/latest-in-cardiology/articles/2017/02/03/09/44/commonly-used-drugs-can-cause-or-worsen-hf>

Dr Assem

What is the most appropriate dose of adrenaline to give during a cardiac arrest?

- ☐ 1ml 1:100,000 IV
- ☐ 10ml 1:1,000 IV
- ☐ 0.5ml 1:1,000 IM
- ☐ 1ml 1:10,000 IV
- ☐ 10ml 1:10,000 IV

1ml 1:100,000 IV

4%

10ml 1:1,000 IV

9%

0.5ml 1:1,000 IM

8%

1ml 1:10,000 IV

31%

10ml 1:10,000 IV

48%

Recommend Adult Life Support (ALS) adrenaline doses

- anaphylaxis: 0.5ml 1:1,000 IM
- cardiac arrest: 10ml 1:10,000 IV or 1ml of 1:1000 IV

Important for me [Less important](#)

10ml of the 1:10,000 preparation contains 1mg of adrenaline.

From the BNF:

Adrenaline (epinephrine) 1 in 10 000 (100 micrograms/mL) is recommended in a dose of 1 mg (10 mL) by intravenous injection repeated every 3-5 minutes if necessary

Dr Assem

A 43-year-old male patient comes to the GP surgery for a review of his recent glucose tolerance test. His past medical history includes epilepsy, renal transplant, hypertension and ischaemic heart disease. The results are as follows.

Fasting blood glucose	6.8 mmol/l
2 hour post-oral load blood glucose	10.9 mmol/l

Which medication is most likely causing these results?

- ☐ Amlodipine
- ☐ Tacrolimus
- ☐ Levetiracetam
- ☐ Lamotrigine
- ☐ Verapamil

Amlodipine

4%

Tacrolimus

74%

Levetiracetam

8%

Lamotrigine

8%

Verapamil

6%

Tacrolimus is a cause of impaired glucose tolerance

Important for me **Less important**

This patient's glucose tolerance test shows impaired glucose tolerance. Tacrolimus is a cause of impaired glucose tolerance.

Amlodipine, levetiracetam, lamotrigine and verapamil do not commonly cause impaired glucose tolerance.

Dr. Arsem

A 62-year-old female patient presents to the GP surgery complaining of a rash on her face and her chest. She reports that she first noticed the rash whilst she went on holiday to Spain in July and she only got back 2 days ago. She has a past medical history of hypertension, ischaemic stroke, type 2 diabetes and epilepsy. On examination, there is a maculopapular erythematous rash on her forehead, both cheeks and anterior chest. You notice that she was recently started on a medication.

What is the most likely medication that may have caused this rash?

- ☐ Clopidogrel
- ☐ Amlodipine
- ☐ Furosemide
- ☐ Bendroflumethiazide
- ☐ Metformin

Clopidogrel

13%

Amlodipine

13%

Furosemide

9%

Bendroflumethiazide

57%

Metformin

8%

Thiazides may cause photosensitivity

Important for me Less important

Given the distribution of the rash and the history, it is likely that this is a photosensitive rash. Thiazides may cause photosensitivity.

Sodium valproate, amlodipine, furosemide and metformin do not usually cause photosensitivity.

Dr Assem

What is the most appropriate time to take blood samples for therapeutic monitoring of lithium levels?

- ☐ At any time
- ☐ Immediately before next dose
- ☐ 4 hours after last dose
- ☐ 6 hours after last dose
- ☐ 12 hours after last dose

At any time

3%

Immediately before next dose

22%

4 hours after last dose

6%

6 hours after last dose

14%

12 hours after last dose

55%

A 59-year-old man with a history of type 2 diabetes mellitus and benign prostatic hypertrophy develops urinary retention associated with acute renal failure. Which one of the following drugs should be discontinued?

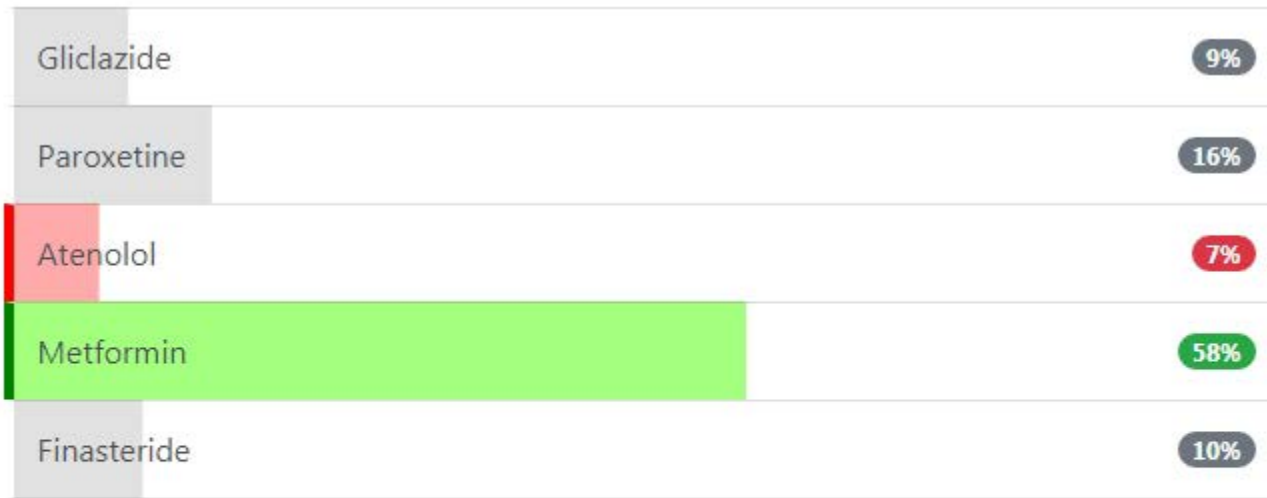
☐ Gliclazide

☐ Paroxetine

☐ Atenolol

☐ Metformin

☐ Finasteride



As the patient has developed acute renal failure metformin should be stopped due to the risk of lactic acidosis. In the long term paroxetine may also need to be stopped as SSRIs can contribute to urinary retention.

A 58-year-old man who is taking lithium for bipolar disorder presents for review. During routine examination he found to be hypertensive with a blood pressure of 166/82 mmHg. This is confirmed with two separate readings. Urine dipstick is negative and renal function is normal. What is the most appropriate medication to start?

- ☐ Amlodipine
- ☐ Ramipril
- ☐ Losartan
- ☐ Bendroflumethiazide
- ☐ Doxazosin

Amlodipine	68%
Ramipril	14%
Losartan	6%
Bendroflumethiazide	6%
Doxazosin	6%

Diuretics, ACE-inhibitors and angiotensin II receptor antagonists may cause lithium toxicity. The BNF advises that neurotoxicity may be increased when lithium is given with diltiazem or verapamil but there is no significant interaction with amlodipine. Alpha-blockers are not listed as interacting with lithium but they would not be first-line treatment for hypertension.

The NICE hypertension guidelines suggest amlodipine wouldn't be a bad first choice, even if we ignore his lithium treatment.

Which one of the following immunosuppressant drugs inhibits calcineurin in T cells?

☐ Mycophenolate mofetil

☐ Basiliximab

☐ Azathioprine

☐ Ciclosporin

☐ Methotrexate

Mycophenolate mofetil

16%

Basiliximab

5%

Azathioprine

9%

Ciclosporin

64%

Methotrexate

5%

Ciclosporin + tacrolimus: inhibit calcineurin thus decreasing IL-2

Important for me Less important

Mycophenolate mofetil inhibits inosine monophosphate dehydrogenase. Azathioprine is metabolised to the active compound mercaptopurine, a purine analogue that inhibits DNA synthesis. Methotrexate is an antimetabolite which inhibits dihydrofolate reductase

A 36-year-old male weighing 70kg presents to the Emergency Department following an overdose of paracetamol in an attempt to end his life. The patient reports to have taken a total of 15 grams of paracetamol over the course of the last 5 hours. He currently feels nauseous, but denies vomiting or abdominal pain.

What is the most appropriate next step in managing this patient?

- ☐ Check serum paracetamol levels and act as per result
- ☐ Give IV N-acetylcysteine immediately
- ☐ Give IV fomepizole immediately
- ☐ Give IV sodium bicarbonate immediately
- ☐ Observe patient and discharge if remains asymptomatic

Check serum paracetamol levels and act as per result

15%

Give IV N-acetylcysteine immediately

76%

Give IV fomepizole immediately

2%

Give IV sodium bicarbonate immediately

2%

Observe patient and discharge if remains asymptomatic

5%

Patients who take a staggered paracetamol overdose should receive treatment with acetylcysteine

Important for me Less important

Patients who present following staggered ingestion of a potentially toxic dose of paracetamol ($>75\text{mg/kg}$) should be commenced on IV acetylcysteine irrespective of serum paracetamol concentrations.

A staggered overdose is defined as 'ingestion of a potentially toxic dose of paracetamol over more than one hour'. This patient has taken $>150\text{mg/kg}$ over a period of 5 hours and therefore should be commenced on treatment.

Fomepizole is used to the treatment of ethylene glycol (antifreeze) poisoning. IV sodium bicarbonate can be given in the treatment of salicylate and tricyclic antidepressant overdose.

Given that the patient has ingested a toxic dose, treatment should not be delayed until the development of symptoms.

Dr Assem

A 62-year-old female with chronic renal failure (GFR = 35 ml/min) is diagnosed as having pulmonary tuberculosis. What changes need to be made to her anti-tuberculosis regime given her renal impairment?

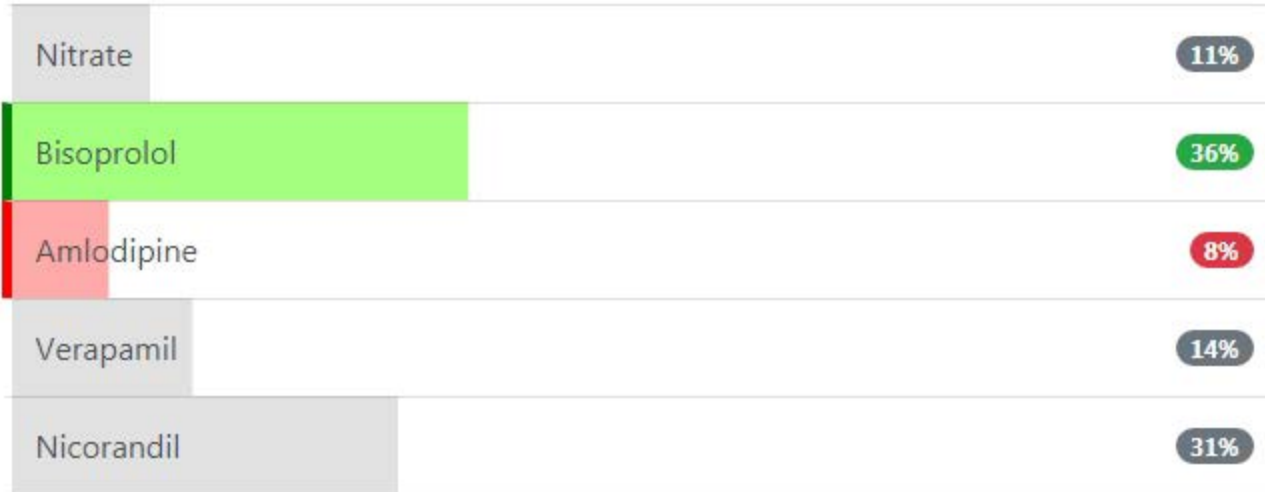
- ☐ Reduction in isoniazid dose
- ☐ Reduction in rifampicin dose
- ☐ Reduction in pyrazinamide dose
- ☐ Reduction in ethambutol dose
- ☐ No changes



A 57-year-old male patient presents to the GP surgery complaining of having very vivid dreams. He reports a 6-week history of having frequent nightmares with extremely disturbing and vivid imagery. He is quite distressed by this. You review his medication and found that he was started on a new medication 6 weeks ago.

Which medication was he likely to have been started on?

- ☐ Nitrate
- ☐ Bisoprolol
- ☐ Amlodipine
- ☐ Verapamil
- ☐ Nicorandil



Beta-blockers can cause sleep disturbance

Important for me Less important

Beta-blockers can cause sleep disturbance.

Side effects of nitrates: hypotension, tachycardia and headache

Side effects of calcium channel blockers: headache, flushing, ankle oedema

Verapamil can also cause constipation

Side effects of nicorandil: headache, flushing and anal ulceration

Immunoglobulin therapy may be indicated in each of the following except:

- ☐ Dermatomyositis
- ☐ Guillain-Barre syndrome
- ☐ Kawasaki disease
- ☐ Idiopathic thrombocytopenic purpura
- ☐ Thrombotic thrombocytopenic purpura



Condition	Percentage
Dermatomyositis	18%
Guillain-Barre syndrome	5%
Kawasaki disease	12%
Idiopathic thrombocytopenic purpura	19%
Thrombotic thrombocytopenic purpura	46%

Dermatomyositis

18%

Guillain-Barre syndrome

5%

Kawasaki disease

12%

Idiopathic thrombocytopenic purpura

19%

Thrombotic thrombocytopenic purpura

46%

The management of management thrombotic thrombocytopenic purpura involves steroids and immunosuppressants. Plasma exchange is also commonly used

Dr Assem

Which of the following drugs is most likely to be affected by a patient's acetylator status?

☐ Ethanol

☐ Hydralazine

☐ Aspirin

☐ Phenytoin

☐ Verapamil

Ethanol

17%

Hydralazine

43%

Aspirin

11%

Phenytoin

23%

Verapamil

6%

Is affected by acetylator status - hydralazine

Important for me Less important

A 43-year-old man presents with known acute intermittent porphyria is brought to the Emergency Department by the police due to an acute psychosis. What is the most suitable drug for sedation?

☐ Chloral hydrate

☐ Diazepam

☐ Phenobarbitone

☐ Chlorpromazine

☐ Primidone

Chloral hydrate

8%

Diazepam

38%

Phenobarbitone

9%

Chlorpromazine

34%

Primidone

11%

Chlorpromazine is considered safe to use in patients with acute intermittent porphyria.
The other drugs are classified as unsafe

A 25-year-old student presents to the GP surgery with a 3-day history of blocked and runny nose, headache and sore throat. He has no other symptoms and has been generally fit and well. He asks you for a medication to help relieve the blocked nose. You prescribe him a phenylephrine hydrochloride nasal spray.

What is the mechanism of action of this medication?

- ☐ Beta-1 adrenoreceptor antagonist
- ☐ Alpha-1 adrenoreceptor agonist
- ☐ Alpha-2 adrenoreceptor antagonist
- ☐ Beta-2 adrenoreceptor agonist
- ☐ Alpha-1 adrenoreceptor antagonist

Beta-1 adrenoreceptor antagonist	7%
Alpha-1 adrenoreceptor agonist	53%
Alpha-2 adrenoreceptor antagonist	13%
Beta-2 adrenoreceptor agonist	11%
Alpha-1 adrenoreceptor antagonist	15%

Phenylephrine is an alpha-1 agonist

Important for me Less important

Phenylephrine is an alpha-1 adrenoreceptor agonist. It causes constriction of the blood vessels to achieve the decongestant effect. It is also used as a vasopressor.

An example of beta-1 antagonists is bisoprolol.

An example of beta-2 antagonists is phentolamine.

An example of beta-2 agonists is salbutamol.

An example of alpha-1 antagonists is doxazosin.

Which of the following is true regarding the pathophysiology of paracetamol overdose?

- ☐ Paracetamol is normally exclusively metabolised by the P450 system
- ☐ Paracetamol overdose leads to an excessive build up of mercapturic acid
- ☐ Conjugation of paracetamol becomes saturated in overdose
- ☐ Glutathione levels increase following paracetamol overdose leading to hepatocellular death
- ☐ N-acetyl cysteine acts by antagonising glutathione

Paracetamol is normally exclusively metabolised by the P450 system

10%

Paracetamol overdose leads to an excessive build up of mercapturic acid

10%

Conjugation of paracetamol becomes saturated in overdose

46%

Glutathione levels increase following paracetamol overdose leading to hepatocellular death

20%

N-acetyl cysteine acts by antagonising glutathione

13%

A 19-year-old female is brought to the Emergency Department by her friends following a night out. Her friends state she has taken an unknown drug whilst out clubbing. Which one of the following features would most point towards the use of ecstasy?

- ☐ Temperature of 39.5°C
- ☐ Respiratory depression
- ☐ Hypernatraemia
- ☐ Miosis
- ☐ Urinary incontinence

Temperature of 39.5°C

55%

Respiratory depression

9%

Hypernatraemia

12%

Miosis

17%

Urinary incontinence

8%

A 34-year-old female with a history of anti-phospholipid syndrome is reviewed in clinic. She is on long-term warfarin and her INR has been stable at 3.0 for over 2 years. Measurement from one week ago and today shows values of 1.5 and 1.3 respectively. Which one of the following medications is most likely to be responsible?

- ☐ Ciprofloxacin
- ☐ Fluconazole
- ☐ Sodium valproate
- ☐ Carbamazepine
- ☐ Cimetidine

Ciprofloxacin

17%

Fluconazole

9%

Sodium valproate

12%

Carbamazepine

54%

Cimetidine

9%

Carbamazepine is a P450 enzyme inductor

Important for me

Less important

What is the most appropriate time to take blood samples for therapeutic monitoring of phenytoin levels?

- ☐ At any time
- ☐ 12 hours after last dose
- ☐ 6 hours after last dose
- ☐ 4 hours after last dose
- ☐ Immediately before next dose

At any time

8%

12 hours after last dose

17%

6 hours after last dose

12%

4 hours after last dose

5%

Immediately before next dose

57%

A 67-year-old man with a history of atrial fibrillation and ischaemic heart disease presents with symptoms consistent with a chest infection. His current medication includes amiodarone, warfarin and simvastatin. Which one of the following antibiotics is it most important to avoid if possible?

☐ Trimethoprim

☐ Co-amoxiclav

☐ Cefaclor

☐ Levofloxacin

☐ Erythromycin



Erythromycin may potentially interact with amiodarone, warfarin and simvastatin. Levofloxacin reacts to a lesser extent with both amiodarone and warfarin.

A 27-year-old female patient presents to the Emergency Department with 3 episodes of tonic-clonic seizure in quick succession. Her past medical history includes epilepsy and recent episode of pyelonephritis. She is not taking any medication for her epilepsy because she has been seizure-free for many years until this episode.

Which medication she started may have caused the recurrence of seizures?

- ☐ Erythromycin
- ☐ Amoxicillin
- ☐ Metronidazole
- ☐ Flucloxacillin
- ☐ Ciprofloxacin

Erythromycin

18%

Amoxicillin

6%

Metronidazole

7%

Flucloxacillin

5%

Ciprofloxacin

64%

Ciprofloxacin lowers the seizure threshold

Important for me Less important

Ciprofloxacin lowers the seizure threshold. It is likely that it was started to treat pyelonephritis.

Erythromycin can prolong QT interval.

Amoxicillin does not lower seizure threshold.

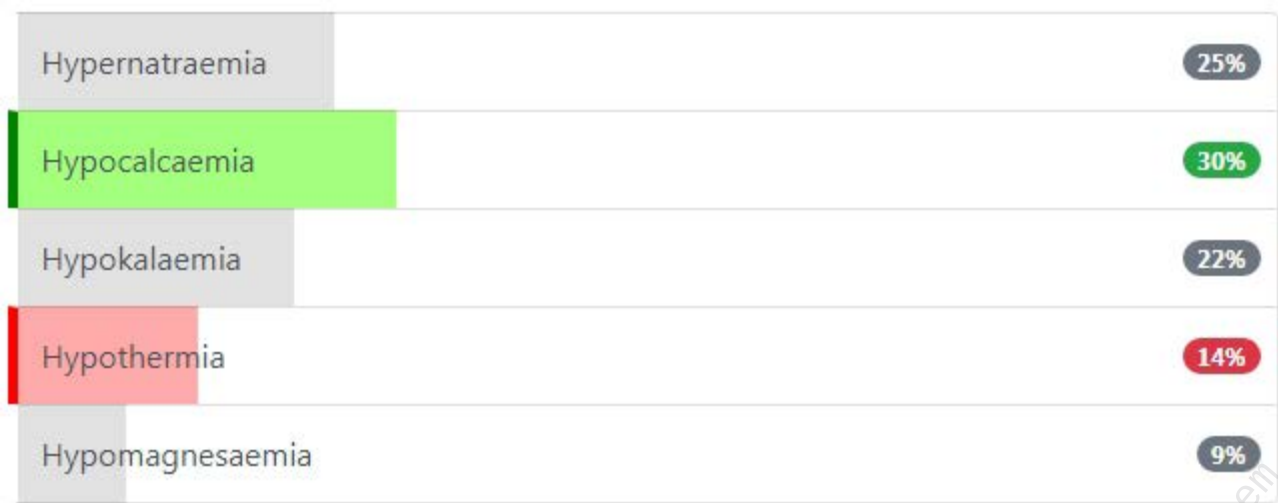
Metronidazole can interact with alcohol.

Flucloxacillin can cause cholestasis.

Dr Assem

Which of the following is least likely to be a precipitating factor in digoxin toxicity?

- ☐ Hyponatraemia
- ☐ Hypocalcaemia
- ☐ Hypokalaemia
- ☐ Hypothermia
- ☐ Hypomagnesaemia



Hyper-, not hypocalcaemia may be a precipitating factor in digoxin toxicity

A 49-year-old male patient presents to the GP surgery for a routine review. You notice that he has a rash on his face. He said he first noticed the rash during a bicycle trip in the south of France. Since he came back from the bicycle trip, the rash has faded slightly. He has a past medical history of cardiac arrhythmia. On examination, there is a maculopapular erythematous rash on his forehead and both cheeks. The rest of the examination is unremarkable.

What is the most likely medication that may have caused the rash?

☐ Amiodarone

☐ Amlodipine

☐ Bisoprolol

☐ Nicorandil

☐ Flecainide



Amiodarone is a cause of photosensitivity

Important for me Less important

This patient is having a photosensitive rash. Given all the medications, amiodarone is the most likely medication to have caused this rash.

Amlodipine, bisoprolol, nicorandil, flecainide do not usually cause photosensitivity.

A 45-year-old female is admitted with a seizure which does not respond to 5mg lorazepam. She is then given an IV loading dose of phenytoin. This is followed by a maintenance dose of once daily oral phenytoin. She later develops ataxia and nystagmus and you are concerned over phenytoin toxicity.

What is the most likely cause of phenytoin toxicity in this patient?

- ☐ First-order elimination
- ☐ Zero-order elimination
- ☐ Renal dysfunction
- ☐ Decreased volume of distribution
- ☐ Long half life

First-order elimination

11%

Zero-order elimination

62%

Renal dysfunction

8%

Decreased volume of distribution

7%

Long half life

11%

Drugs which exhibit zero-order kinetics include phenytoin, alcohol and salicylates

Important for me Less important

In clinical pharmacology, first order kinetics are considered as a linear process, because the rate of elimination is proportional to the drug concentration. This means that the higher the drug concentration, the higher its elimination rate. In other words, the elimination processes are not saturated and can adapt to the needs of the body, to reduce accumulation of the drug. 95% of the drugs in use at therapeutic concentrations are eliminated by first order elimination kinetics.

Zero order elimination describes drugs in which the clearance rate depends on an easily saturated enzyme system. As soon as the system is saturated, the rate of clearance plateaus, and does not vary no matter how much drug is present. This results in a constant rate of elimination predisposing to high levels of the drug and toxicity. Drugs which exhibit zero-order kinetics include phenytoin, alcohol and salicylates.

The half life of phenytoin has an average of 14 hours. Drugs with long half lives are more likely to accumulate and often need therapeutic drug monitoring. The half life is essential to decide on the appropriate dosing interval.

Phenytoin is metabolised by the liver and excreted in bile as an inactive metabolite. Phenytoin is minimally renal excreted, and dose modification is not required for renal dysfunction, even if severe.

This patient is on a once daily dose of phenytoin, therefore the long half life of this agent is unlikely to be playing a dominant role in the mechanism of toxicity. It is therefore most likely to be the zero order pharmacokinetics resulting in toxicity.

A 35-year-old female diabetic is started on erythromycin for gastroparesis. What is the mechanism of action?

- ☐ Promotes gastric emptying
- ☐ Inhibits bacterial overgrowth
- ☐ Acts on central chemoreceptor trigger zone
- ☐ Relaxation of pyloric sphincter
- ☐ Stimulates cholecystokinin release

Promotes gastric emptying

61%

Inhibits bacterial overgrowth

16%

Acts on central chemoreceptor trigger zone

6%

Relaxation of pyloric sphincter

7%

Stimulates cholecystokinin release

10%

Erythromycin is used in gastroparesis as it has prokinetic properties

Dr Assem

Each of the following drugs are known to inhibit cytochrome P450, except:

- ☐ Ketoconazole
- ☐ Ciprofloxacin
- ☐ Erythromycin
- ☐ Clopidogrel
- ☐ Amiodarone

Ketoconazole

12%

Ciprofloxacin

11%

Erythromycin

12%

Clopidogrel

50%

Amiodarone

15%

Dr Assem

A 70-year-old man who takes warfarin for atrial fibrillation is found to have an INR of 6.2. Which of the following drugs is he most likely to have recently taken?

- ☐ Ciprofloxacin
- ☐ Flucloxacillin
- ☐ St John's Wort
- ☐ Carbamazepine
- ☐ Aspirin



Ciprofloxacin is a P450 enzyme inhibitor

Important for me Less important

Ciprofloxacin is a known inhibitor of the P450 system and hence may cause an increase in INR.

A 54-year-old man with hypertension is reviewed in clinic. He complains that over the past two months he has developed ankle swelling. Which one of the following drugs is most likely to be responsible?

- ☐ Perindopril
- ☐ Amlodipine
- ☐ Doxazosin
- ☐ Moxonidine
- ☐ Losartan

Perindopril

7%

Amlodipine

80%

Doxazosin

4%

Moxonidine

4%

Losartan

5%

Calcium channel blockers - side-effects: headache, flushing, ankle oedema

Important for me Less important

What is the main mechanism of action of ondansetron?

- ☐ Dopamine receptor agonist
- ☐ 5-HT₂ receptor antagonist
- ☐ Dopamine receptor antagonist
- ☐ 5-HT₂ receptor agonist
- ☐ 5-HT₃ receptor antagonist

Dopamine receptor agonist

3%

5-HT2 receptor antagonist

20%

Dopamine receptor antagonist

6%

5-HT2 receptor agonist

7%

5-HT3 receptor antagonist

65%

Which one of the following is an established indication for the use of Botulinum toxin?

- ☐ Strabismus
- ☐ Hirschsprung's disease
- ☐ Blepharospasm
- ☐ Bell's palsy
- ☐ Upper limb rigidity in Parkinson's disease

Strabismus

16%

Hirschsprung's disease

9%

Blepharospasm

55%

Bell's palsy

9%

Upper limb rigidity in Parkinson's disease

10%

A 22-year-old man consults you as he and his housemate have been feeling generally unwell for the past few weeks. Which one of the following is the most common feature of carbon monoxide poisoning?

☐ Hyperpyrexia

☐ Nausea

☐ Cherry red skin

☐ Confusion

☐ Headache

Hyperpyrexia

4%

Nausea

4%

Cherry red skin

22%

Confusion

8%

Headache

62%

Carbon monoxide poisoning - most common feature = headache

Important for me

Less important

Cherry red skin is a sign of severe toxicity and is usually seen post-mortem

Dr Assem

A 49-year-old homeless man is admitted to the ITU after drinking a large quantity of methanol. Treatment with fomepizole is started. What is the mechanism of action of fomepizole?

- ☐ Chelates methanol
- ☐ Competitive inhibition of alcohol dehydrogenase
- ☐ Converts methanol to ethanol
- ☐ Competitive inhibition of aldehyde dehydrogenase
- ☐ Formaldehyde dehydrogenase inhibitor

Chelates methanol

4%

Competitive inhibition of alcohol dehydrogenase

67%

Converts methanol to ethanol

7%

Competitive inhibition of aldehyde dehydrogenase

15%

Formaldehyde dehydrogenase inhibitor

6%

Fomepizole - used in ethylene glycol and methanol poisoning - competitive inhibitor of alcohol dehydrogenase

Important for me Less important

Which one of the following drugs is not known to induce the cytochrome p450 enzyme system?

- ☐ Rifampicin
- ☐ Isoniazid
- ☐ Phenobarbitone
- ☐ Griseofulvin
- ☐ Carbamazepine

Rifampicin

15%

Isoniazid

53%

Phenobarbitone

8%

Griseofulvin

14%

Carbamazepine

10%

Isoniazid **inhibits** the P450 system

Important for me Less important

Isoniazid is an inhibitor of the P450 system

Dr Assem

You are asked to review a 79-year-old man who reports new onset yellow tinting of his vision. He reports he is on numerous medications but cannot remember their names. His past medical history is significant for heart failure, benign prostatic hyperplasia and COPD. Which of the following medications is most likely responsible for this side effect?

☐ Furosemide

☐ Ramipril

☐ Digoxin

☐ Sildenafil

☐ Salbutamol



Digoxin may cause yellow-green vision

Important for me Less important

Due to its narrow therapeutic range, digoxin has a high risk of causing toxicity in patients. A characteristic feature of toxicity is xanthopsia or yellow-tinted vision.

Sildenafil can cause blue-tinted vision or cyanopsia.

Which one of the following ECG changes is most consistent with a tricyclic overdose?

- ☐ QRS widening
- ☐ Bradycardia
- ☐ Shortening of QT interval
- ☒ First degree heart block
- ☐ ST elevation

QRS widening

67%

Bradycardia

8%

Shortening of QT interval

13%

First degree heart block

8%

ST elevation

4%

A 41-year-old woman is admitted following a deliberate overdose of ethylene glycol. She is confused and unable to give any further history. On examination the pulse is 96 / min, blood pressure is 142/84 mmHg and temperature 37.1°C. Blood tests show:

Na ⁺	139 mmol/l
K ⁺	4.0 mmol/l
Chloride	104 mmol/l
Bicarbonate	26 mmol/l
Urea	4.0 mmol/l
Creatinine	88 µmol/l

What is the most appropriate management of this patient?

- ☐ Ethanol
- ☐ Fomepizole
- ☐ Haemodialysis
- ☐ Haemofiltration
- ☐ Dantrolene

Ethanol

17%

Fomepizole

69%

Haemodialysis

9%

Haemofiltration

2%

Dantrolene

3%

Ethylene glycol toxicity management - fomepizole. Also ethanol / haemodialysis

Important for me Less important

Fomepizole is now used first-line rather than ethanol in ethylene glycol toxicity. There is no indication for haemodialysis at this stage, as a metabolic acidosis has not yet developed

Dr Assem

A 44-year-old man asks for advice. He is due to go on a long bus journey but suffers from debilitating motion sickness. Which one of the following medications is most likely to prevent motion sickness?

- ☐ Cyclizine
- ☐ Chlorpromazine
- ☐ Metoclopramide
- ☐ Prochlorperazine
- ☐ Domperidone

Cyclizine

41%

Chlorpromazine

12%

Metoclopramide

10%

Prochlorperazine

31%

Domperidone

7%

Motion sickness - hyoscine > cyclizine > promethazine

Important for me

Less Important

A woman who is about to commence trastuzumab treatment for breast cancer has an echocardiogram. Which class of chemotherapeutic agent would predispose her to developing cardiac dysfunction?

- ☐ Vinca alkaloids
- ☐ Platinum-based compounds
- ☐ Anthracyclines
- ☐ Taxanes
- ☐ Topoisomerase I inhibitors

Vinca alkaloids

12%

Platinum-based compounds

13%

Anthracyclines

45%

Taxanes

11%

Topoisomerase I inhibitors

18%

A 54-year-old woman is treated with rituximab for non-Hodgkin's lymphoma. What is the target of rituximab?

- ☐ CD20
- ☐ CD52
- ☐ Epidermal growth factor receptor
- ☐ CD22
- ☐ Vascular endothelial growth factor receptor

CD20

66%

CD52

9%

Epidermal growth factor receptor

11%

CD22

7%

Vascular endothelial growth factor receptor

8%

Rituximab - monoclonal antibody against CD20

Important for me

Less important

A 26-year-old female is commenced on carbamazepine for complex partial seizures. She has no previous medical history of note and consumes a moderate amount of alcohol. Three months later she is admitted due to series of seizures and carbamazepine levels are noted to be subtherapeutic. A pill-count reveals the patient is fully compliant. What is the most likely explanation?

- ☐ Auto-inhibition of liver enzymes
- ☐ Prescription of omeprazole
- ☐ Prescription of fluoxetine
- ☐ Auto-induction of liver enzymes
- ☐ Alcohol binge

Auto-inhibition of liver enzymes

11%

Prescription of omeprazole

8%

Prescription of fluoxetine

7%

Auto-induction of liver enzymes

52%

Alcohol binge

22%

Carbamazepine is a P450 enzyme inducer

Important for me Less important

Carbamazepine is an inducer of the P450 system. This in turn increases the metabolism of carbamazepine itself - auto-induction

A 24-year-old woman presents following a sudden, acute onset of pain at the back of the ankle whilst jogging, during which she heard a cracking sound. Which one of the following medications may have contributed to this injury?

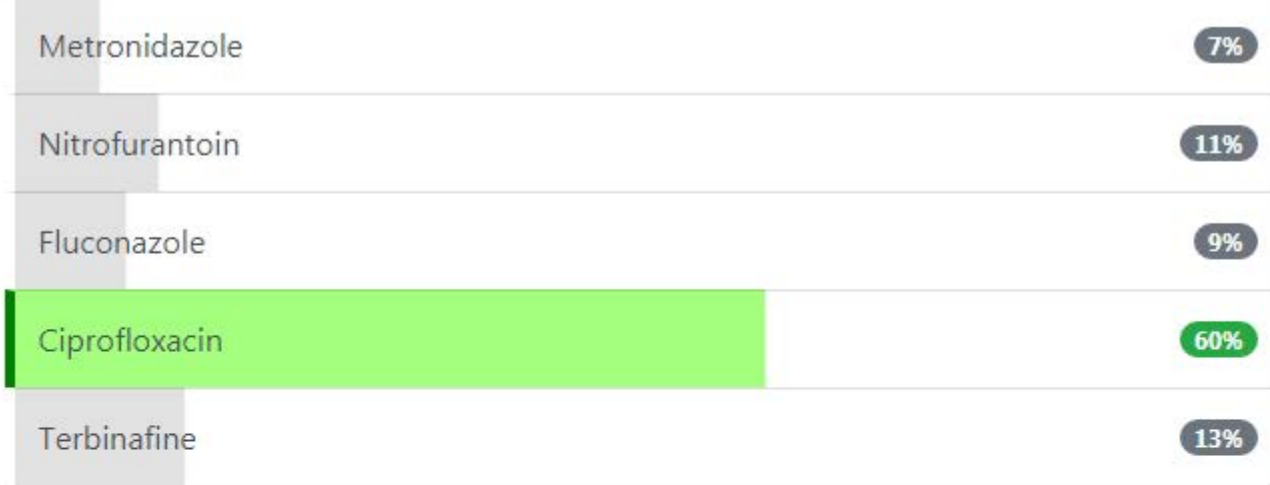
☐ Metronidazole

☐ Nitrofurantoin

☐ Fluconazole

☐ Ciprofloxacin

☐ Terbinafine



Ciprofloxacin may lead to tendinopathy

Important for me Less important

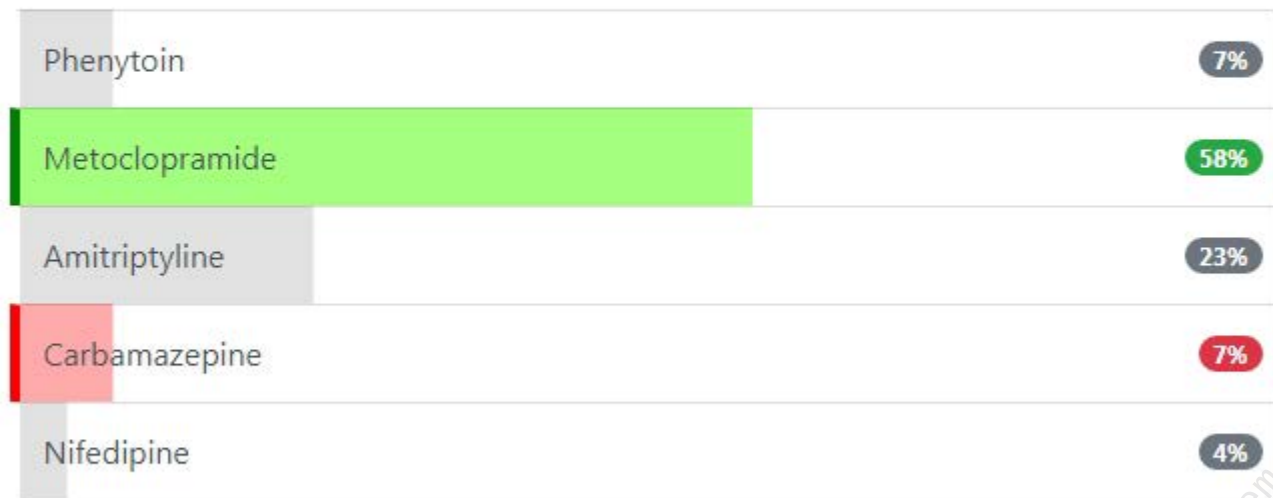
This patient has classical signs of Achilles tendon rupture. Tendon damage is a well documented complication of quinolone therapy. It appears to be an idiosyncratic reaction, with the actual median duration of treatment being 8 days before problems occur

Dr Assem

A 14-year-old girl is taken to the Emergency Department, after being found lying on her bed next to an empty bottle of pills prescribed for her mother. On examination she is agitated, has a clenched jaw and her eyes are deviated upwards. Which drug is she most likely to have consumed?

- ☐ Phenytoin
- ☐ Metoclopramide
- ☐ Amitriptyline
- ☐ Carbamazepine
- ☐ Nifedipine

A 14-year-old girl is taken to the Emergency Department, after being found lying on her bed next to an empty bottle of pills prescribed for her mother. On examination she is agitated, has a clenched jaw and her eyes are deviated upwards. Which drug is she most likely to have consumed?



This is a classic description of an oculogyric crisis, a form of extrapyramidal disorder

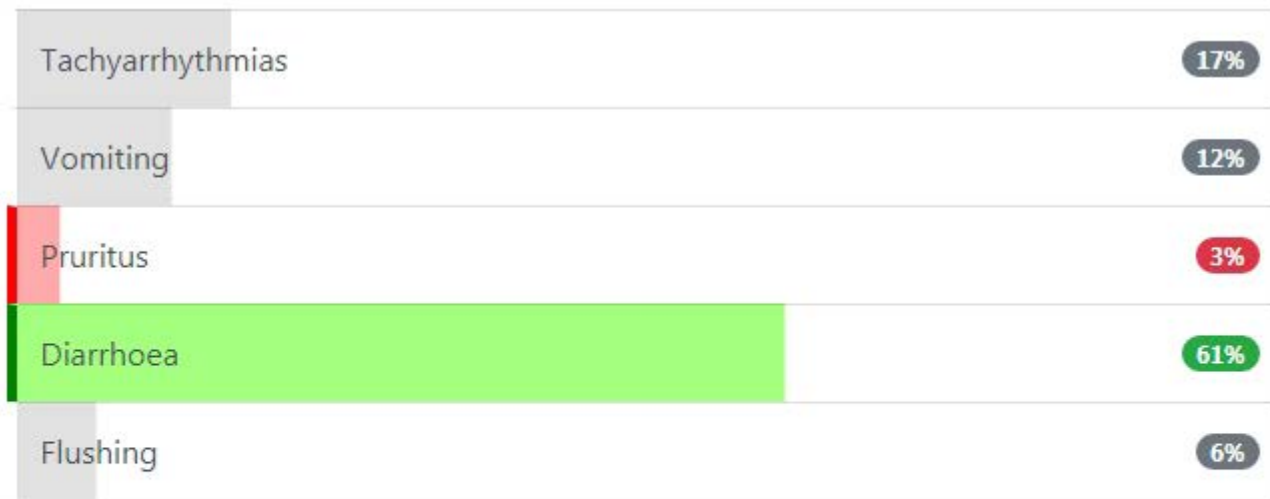
A 46-year-old female with a background of alcohol excess has routine bloods checked by her GP. The magnesium result comes back as follows:

Magnesium	0.43 mmol/l
-----------	-------------

(Normal range 0.7-1.0 mmol/l)

What side effect of oral magnesium replacement is likely to be the limiting factor when increasing the oral dosage?

- ☐ Tachyarrhythmias
- ☐ Vomiting
- ☐ Pruritus
- ☐ Diarrhoea
- ☐ Flushing



Diarrhoea is the correct answer. Magnesium salts can be given as laxatives. Other uses for magnesium include polymorphic ventricular tachycardia (torsade de pointes), acute asthma and prevention/treatment of seizures in pre-eclampsia.

A 62-year-old man presents four weeks after initiating metformin for type 2 diabetes mellitus. His body mass index is 27.5 kg/m^2 . Despite slowly titrating the dose up to 500mg tds he has experienced significant diarrhoea. He has tried reducing the dose back down to 500mg bd but his symptoms persisted. What is the most appropriate action?

- ☐ Switch to pioglitazone 15mg od
- ☐ Switch to gliclazide 40mg od
- ☐ Start modified release metformin 500mg od with evening meal
- ☐ Add loperamide as required
- ☐ Arrange colonoscopy

Switch to pioglitazone 15mg od	9%
Switch to gliclazide 40mg od	19%
Start modified release metformin 500mg od with evening meal	61%
Add loperamide as required	6%
Arrange colonoscopy	5%

Metformin should be titrated slowly, leave at least 1 week before increasing dose

Important for me Less important

If a patient is intolerant to standard metformin then modified-release preparations should be tried. There is some evidence that these produce fewer gastrointestinal side-effects in patients intolerant of standard-release metformin.

A 43-year-old male presents to the Emergency Department after being found at home drowsy and unresponsive. His only regular medication is citalopram. The following arterial blood gas is obtained on arrival.

pH	7.20 kPa
pCO2	3.4 kPa
pO2	13.0 kPa
Anion gap	24 mmol/l
Lactate	2.1 mmol/l
Glucose	5.6 mmol/l

(normal range anion gap: 12-16 mmol/l)

Both ethanol and paracetamol levels are normal.

Which of the following is the most appropriate treatment?

- ☐ Flumazenil
- ☐ Naloxone
- ☐ Ethanol
- ☐ Insulin infusion
- ☐ N-acetylcysteine

Dr Assem

Flumazenil	33%
Naloxone	15%
Ethanol	34%
Insulin infusion	7%
N-acetylcysteine	12%

The causative agent here is ethylene glycol (antifreeze). A background of depression and a raised anion gap that cannot be explained by lactic or ketoacidosis are clues towards intentional overdose of a toxin causing acidosis. By eliminating the other options, the only viable answer is ethanol.

The blood gas shows metabolic acidosis with respiratory compensation. Flumazenil would be used in benzodiazepine overdose, naloxone in opiate overdose and n-acetylcysteine in paracetamol overdose. Opiates and benzodiazepines are more likely to cause respiratory acidosis through respiratory depression. In view of the normal glucose level this excludes diabetic ketoacidosis and thus insulin infusion is not appropriate. Given the normal serum paracetamol levels, n-acetylcysteine is not indicated. N-acetylcysteine acts by protecting hepatocytes from a toxic metabolite produced when the liver breaks down paracetamol. Paracetamol overdose would also cause a high anion gap metabolic acidosis usually due to an associated elevation in lactate.

The anion gap can be used to identify the cause of a metabolic acidosis.
The calculation is as follows: $(\text{Na}^+ + \text{K}^+) - (\text{Cl}^- + \text{HCO}_3^-)$

Raised anion gap causes include:

- lactic acidosis
- ketoacidosis
- renal failure (high urate)
- toxins such as methanol, ethylene glycol, salicylates

The treatment for ethylene glycol poisoning includes oral or parenteral ethanol which competes with ethylene glycol preventing toxic metabolite formation. Methanol poisoning would present in a similar fashion although this is often associated with visual disturbance and occasionally blindness. Fomepizole can also be used to treat ethylene glycol poisoning.

In most centres there is a delay in obtaining ethylene glycol levels and thus treatment is often given based on clinical suspicion.

A 44-year-old woman with oestrogen receptor positive breast cancer comes for review, three months after starting tamoxifen. Which one of the following adverse effects is most likely to occur in this patient?

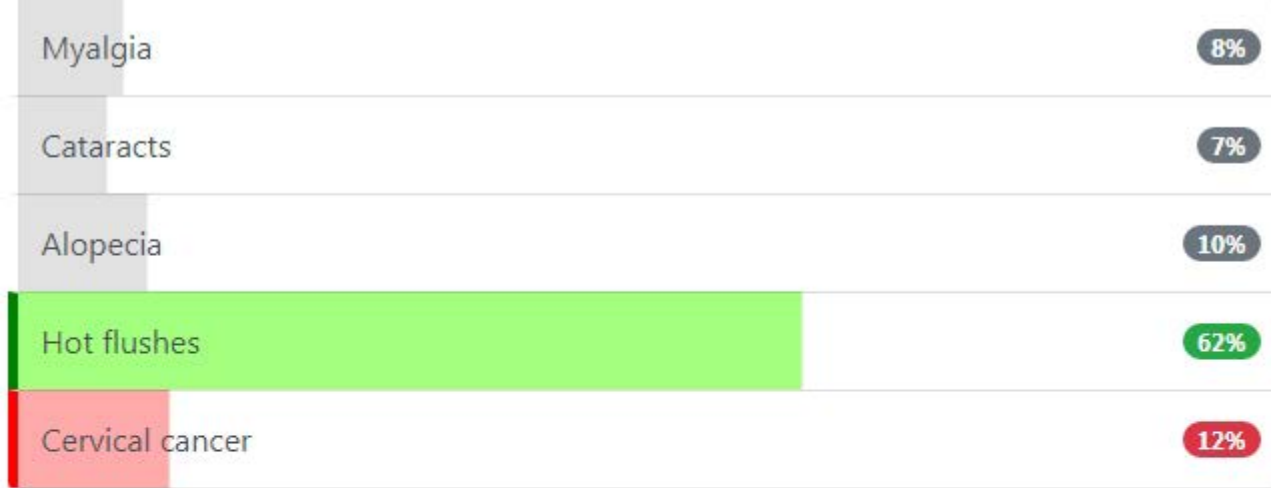
☐ Myalgia

☐ Cataracts

☐ Alopecia

☐ Hot flushes

☐ Cervical cancer



Tamoxifen may cause hot flushes

Important for me Less important

Alopecia and cataracts are listed in the BNF as possible side-effects. They are however not as prevalent as hot flushes, which are very common in pre-menopausal women

An elderly man is admitted to the acute medical unit with dyspnoea. He is known to have ischaemic heart disease and chronic heart failure (NYHA class III). He develops atrial fibrillation with a fast ventricular response during his admission. Which one of the following drugs is contraindicated?

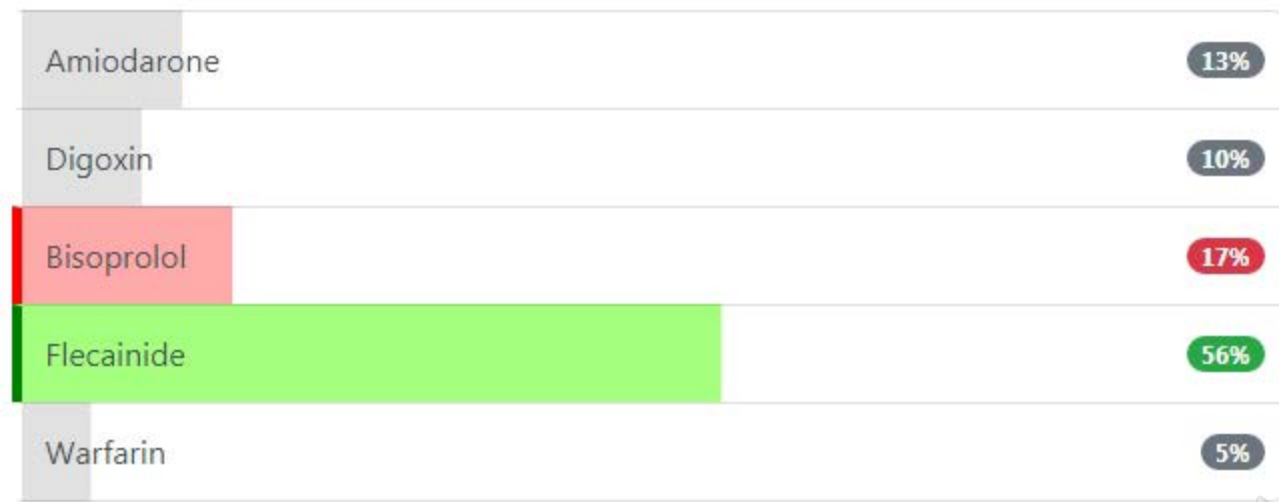
☐ Amiodarone

☐ Digoxin

☐ Bisoprolol

☐ Flecainide

☐ Warfarin



Flecainide is contraindicated in patients with structural heart disease.

A 52-year-old lady is admitted from the emergency department to the intensive care unit with septic shock secondary to pyelonephritis. Despite 4000ml of IV 0.9% saline in the emergency department she remained hypotensive and was commenced on noradrenaline and a fixed dose vasopressin infusion. Unfortunately, despite escalating doses of noradrenaline, her mean arterial pressure (MAP) remains 50mmHg (target ≥ 65 mmHg). She has a rising serum lactate and she has produced only 25ml urine since admission 2h ago. Following consultation with your consultant you elect to start an adrenaline infusion in addition to the vasopressin and noradrenaline. Which of the following biochemical abnormalities can be expected on commencing an IV adrenaline infusion?

- ☐ Hyperkalaemia
- ☐ Hypoglycaemia
- ☐ Hypernatraemia
- ☐ Increase in lactate production
- ☐ Hypercalcaemia

Hyperkalaemia	16%
Hypoglycaemia	21%
Hypernatraemia	13%
Increase in lactate production	42%
Hypercalcaemia	8%

Adrenaline induces hyperglycemia, hyperlactatemia and hypokalaemia. Because insulin secretion is suppressed by alpha adrenergic stimulation, plasma concentration of insulin remains low. Hyperglycemia is induced by an increase in glucose production caused by an increase in hepatic glycogenolysis and an increase in gluconeogenesis. There is also a marked increase in oxygen consumption. In skeletal muscle, epinephrine increases glycolysis and glycogenolysis, inducing an upsurge in lactate. Muscular lactate serves as a substrate for hepatic neoglucogenesis (Cori cycle). Epinephrine also increases lipolysis and decreases muscular proteolysis.

A 17 year-old male presents to the Emergency department after being found collapsed at home. He has no past medical history. He is afebrile. On examination he appears unwell. His Glasgow Coma Score (GCS) is 9 (eyes 2, voice 2, motor 5), and he has poor pupillary responses bilaterally. Fundoscopy reveals macular oedema. His arterial blood gas on air is shown:

pH	7.21
pCO ₂	4.7 kPa
pO ₂	15.6 kPa
Na ⁺	143 mmol/L
K ⁺	4.7 mmol/L
HCO ₃ ⁻	12 mmol/L
Cl ⁻	108 mmol/L
Glucose	12.4 mmol/L

What is the likely diagnosis?

- ☐ Diabetic ketoacidosis
- ☐ Ethylene glycol overdose
- ☐ Addisonian crisis
- ☐ Methanol toxicity
- ☐ Viral meningitis

Diabetic ketoacidosis	20%
Ethylene glycol overdose	25%
Addisonian crisis	4%
Methanol toxicity	46%
Viral meningitis	4%

This patient has features of a raised anion-gap metabolic acidosis. The most important differentials given are methanol toxicity or ethylene glycol poisoning, which cause a very similar biochemical and clinical picture. However, the finding of eye signs (macular oedema and poor pupillary responses) in the context of a drowsy patient with raised anion gap metabolic acidosis is strongly suggestive that methanol is the culprit. In exams, cases involving methanol toxicity often involve patients not meeting your gaze or asking for the lights to be switched on, as well as the more traditional visual acuity results.

The patient's blood glucose is not high enough to consider diabetic ketoacidosis. An Addisonian crisis would not typically generate a high anion gap. Viral meningitis is unlikely to cause collapse and impaired GCS, and would not explain his acidosis.

A 49-year-old man with a history of bipolar disorder, COPD and hypertension is started on a new anti-hypertensive medication. Two weeks later he is admitted to hospital with lithium toxicity. Which medication is most likely to have precipitated this?

- ☐ Ramipril
- ☐ Aminophylline
- ☐ Atenolol
- ☐ Amlodipine
- ☐ Doxazosin

Ramipril

55%

Aminophylline

18%

Atenolol

9%

Amlodipine

10%

Doxazosin

8%

A 67-year-old man has a full blood count 8 days after being admitted with a severe community-acquired pneumonia. He had been treated with intravenous antibiotics and subcutaneous low-molecular weight heparin as he had a history of deep vein thrombosis. The results are as follows:

Hb	13.0 g/l
Platelets	$21 \times 10^9/l$
WBC	$12.1 \times 10^9/l$

What is the most likely cause of the abnormalities in the blood test?

- ☐ Antibodies against complexes of platelet factor 4 (PF4) and heparin
- ☐ Antibodies against platelet-activating factor
- ☐ Antibodies form against complexes of GP1b-IX-V and von Willebrand factor
- ☐ Antibodies against heparin act as agonists of the GPIIb/IIIa receptor
- ☐ Antibodies form against factor VII

Antibodies against complexes of platelet factor 4 (PF4) and heparin

58%

Antibodies against platelet-activating factor

12%

Antibodies form against complexes of GP1b-IX-V and von Willebrand factor

8%

Antibodies against heparin act as agonists of the GPIIb/IIIa receptor

18%

Antibodies form against factor VII

4%

Heparin-induced thrombocytopenia - antibodies form against complexes of platelet factor 4 (PF4) and heparin

Important for me Less important

A 20-year-old student drinks around 500 ml of vodka at a party. The next morning he feels thirsty and finds he is passing more urine than normal. Which one of the following best explains why people who drink excessive amounts alcohol develop polyuria?

- ☐ Ethanol inhibits ADH secretion
- ☐ Ethanol induces vasoconstriction of the renal arteries
- ☐ Ethanol increases aquaporin proteins in the proximal convoluted tubule
- ☐ Osmotic diuresis induced by ethanol
- ☐ Supratentorial reflex to cleanse the body of toxins

Ethanol inhibits ADH secretion

48%

Ethanol induces vasoconstriction of the renal arteries

4%

Ethanol increases aquaporin proteins in the proximal convoluted tubule

16%

Osmotic diuresis induced by ethanol

28%

Supratentorial reflex to cleanse the body of toxins

4%

Ethanol reduces the calcium-dependent secretion of anti-diuretic hormone (ADH) by blocking channels in the neurohypophyseal nerve terminal.

Nausea associated with hangovers is mainly due to vagal stimulation to the vomiting centre. Following a particular severe episode of alcohol excess people may experience tremors. These are due to increased glutamate production by neurones to compensate for the previous inhibition by ethanol.

Which one of the following side-effects is most associated with ciclosporin use?

- ☐ Hepatotoxicity
- ☐ Bone marrow toxicity
- ☐ Red cell aplasia
- ☐ Haemorrhagic cystitis
- ☐ Tinnitus

Hepatotoxicity

53%

Bone marrow toxicity

13%

Red cell aplasia

10%

Haemorrhagic cystitis

14%

Tinnitus

10%

Ciclosporin may cause nephrotoxicity

Important for me Less important

The hospital you work at is on red alert after a suspected chemical attack in the city. Twenty five patients have been admitted to the hospital. The patients are extremely unwell. Their symptoms include salivation, lacrimation, diarrhoea, and emesis.

You are instructed by public health that the most likely agent used was sarin gas.

What is the mechanism of action of sarin gas?

☐ Inhibition of acetylcholinesterase

☐ Anti-cholinergic

☐ Sympathomimetic

☐ Sedative-hypnotic

☐ Serotonergic

Inhibition of acetylcholinesterase	62%
Anti-cholinergic	17%
Sympathomimetic	11%
Sedative-hypnotic	3%
Serotonergic	7%

Sarin gas is a highly toxic synthetic organophosphorus compound which causes inhibition of the enzyme acetylcholinesterase

Important for me [Less important](#)

Sarin gas is a highly toxic synthetic organophosphorus compound which causes inhibition of the enzyme acetylcholinesterase. This results in high levels of acetylcholine (ACh).

The effects of excessive ACh can be remembered by the mnemonic DUMBELLS:

- Diarrhoea
- Urination
- Miosis/muscle weakness
- Bronchorrhea/Bradycardia
- Emesis
- Lacrimation
- Salivation/sweating

Organophosphate poisoning is treated with the anti-muscarinic atropine.

Which one of the following is least recognised as a side-effect of sildenafil?

- ☐ Blue discolouration of vision
- ☐ Abnormal liver function tests
- ☐ Flushing
- ☐ Nasal congestion
- ☐ Non-arteritic anterior ischaemic optic neuropathy

Blue discolouration of vision

13%

Abnormal liver function tests

46%

Flushing

8%

Nasal congestion

12%

Non-arteritic anterior ischaemic optic neuropathy

21%

Dr. Assem

Which one of the following is not a recognised indication for the use of octreotide?

☐ Acute variceal haemorrhage

☐ Acromegaly

☐ VIPoma

☐ Carcinoid syndrome

☐ Hepatic encephalopathy

Acute variceal haemorrhage

17%

Acromegaly

8%

VIPoma

10%

Carcinoid syndrome

7%

Hepatic encephalopathy

58%

Dr Assem

A 23-year old gentleman presents to the emergency department having ingested approximately 120ml of household bleach two hours ago. He has a background of depression and previous suicidal ideation. Currently he is reporting pain on swallowing saliva since the ingestion. Cardiovascular, respiratory and abdominal examination were unremarkable. There is no evidence of surgical emphysema or stridor. A chest x-ray is reported as normal.

What is the most appropriate course of action?

- ☐ Trial of oral fluid, observe for 6 hours and discharge if his symptoms do not worsen
- ☐ Nil by mouth, intravenous proton pump inhibitor, oesophago-gastroduodenoscopy in 5 days
- ☐ Insert a wide-bore nasogastric tube and apply suction
- ☐ Nil by mouth, intravenous proton pump inhibitor, urgent oesophago-gastroduodenoscopy
- ☐ Nil by mouth, oesophago-gastroduodenoscopy in 5 days

worsen

Nil by mouth, intravenous proton pump inhibitor, oesophago-gastroduodenoscopy in 5 days

27%

Insert a wide-bore nasogastric tube and apply suction

8%

Nil by mouth, intravenous proton pump inhibitor, urgent oesophago-gastroduodenoscopy

47%

Nil by mouth, oesophago-gastroduodenoscopy in 5 days

7%

Early endoscopy and risk stratification is important in patients with symptomatic caustic ingestion

Important for me Less important

Caustic ingestion is a relatively common presentation, with a relative paucity of evidence to support its management. The correct answer here is early endoscopy, ideally within 12 hours (sometimes 24 hours dependent on local guidance). It would seem tempting to wait until after the initial insult has passed until performing an endoscopy: however, most guidelines advocate avoiding endoscopy between days 5 and 15 post ingestion when oesophageal strength is at its lowest (based on experimental data from animal models). Both options advocating delayed endoscopy are therefore incorrect. Nasogastric tube insertion involves potential re-exposure of the upper GI tract to the substance and is therefore not advisable. A trial of oral fluid and observation may be appropriate in asymptomatic patients however this patient has odynophagia and should be investigated.

A 43-year-old gentleman presents to the emergency department with central crushing chest pain. ECG shows anterior T wave inversion. He admits to insufflating three lines of cocaine around one hour prior to presentation. He is a heavy smoker but has no past medical history. In addition to the standard acute coronary syndrome management, which further treatment should this patient be offered?

- ☐ IV beta-blocker
- ☐ IV alpha-blocker
- ☐ IV benzodiazepine
- ☐ IV haloperidol
- ☐ IV dextrose

IV beta-blocker

20%

IV alpha-blocker

14%

IV benzodiazepine

52%

IV haloperidol

4%

IV dextrose

9%

Patients with MI secondary to cocaine use should be given IV benzodiazepines as part of acute (ACS) treatment

Important for me Less important

Consensus agreement from bodies such as the American Heart Association recommend early IV benzodiazepine therapy in addition to ACS treatment in patients with cocaine-related MI. The benzodiazepines are thought to temper the systemic effects of cocaine. Beta-blocker therapy is suggested to be avoided as unopposed alpha-activation in cocaine intoxication can worsen coronary spasm.

Dr Assem

Which one of the following adverse effects is most likely to be seen in patients taking ciclosporin?

- ☐ Hypertension
- ☐ Hypokalaemia
- ☐ Alopecia
- ☐ Dehydration
- ☐ Atrophy of the gums

Hypertension

60%

Hypokalaemia

11%

Alopecia

12%

Dehydration

4%

Atrophy of the gums

13%

Ciclosporin side-effects: everything is increased - fluid, BP, K^+ , hair, gums, glucose

Important for me Less important

Which one of the following statements is true regarding monoclonal antibodies?

- ☐ They are produced by the polymerase chain reaction
- ☐ Infliximab is useful in chronic lymphocytic leukaemia
- ☐ A hybridoma is a combination of human spleen cells and mouse B-cells
- ☐ The constant region of the antibody is human in origin
- ☐ Alemtuzumab is used in the prevention of ischaemic events in patients undergoing percutaneous coronary interventions

They are produced by the polymerase chain reaction

12%

Infliximab is useful in chronic lymphocytic leukaemia

14%

A hybridoma is a combination of human spleen cells and mouse B-cells

25%

The constant region of the antibody is human in origin

39%

Alemtuzumab is used in the prevention of ischaemic events in patients undergoing percutaneous coronary interventions

10%

A 46-year-old man with a history of hyperlipidaemia is reviewed in clinic. He is currently taking simvastatin 10mg on but his cholesterol level remains high. Previous attempts to increase the dose of simvastatin have resulted in myalgia. Given the history of myalgia, which lipid-regulating drug should be avoided?

- ☐ Nicotinic acid
- ☐ Bezafibrate
- ☐ Colestyramine
- ☐ Omega-3 fatty acid
- ☐ Ezetimibe

Nicotinic acid

20%

Bezafibrate

46%

Colestyramine

10%

Omega-3 fatty acid

4%

Ezetimibe

20%

Tough question as both fibrates and nicotinic acid have been associated with myositis, especially when combined with a statin. However, the Committee on Safety of Medicines has produced guidance which specifically warns about the concomitant prescription of fibrates with statins in relation to muscle toxicity

A patient known to have bipolar disorder presents to the Emergency Department with confusion. Which one of the following drugs is most likely to precipitate lithium toxicity?

- ☐ Frusemide
- ☐ Sodium valproate
- ☐ Digoxin
- ☐ Sodium bicarbonate
- ☐ Bendroflumethiazide

Frusemide

22%

Sodium valproate

9%

Digoxin

8%

Sodium bicarbonate

3%

Bendroflumethiazide

57%

The BNF states that 'loop diuretics are safer than thiazides' in the interactions section.

A 62-year-old is started on allopurinol prophylaxis following his second episode of gout in the past 12 months. What is the mechanism of action of allopurinol?

- ☐ Promotes excretion of uric acid
- ☐ Causes the depolymerisation of intracellular microtubules
- ☐ Uric acid chelator
- ☐ Inhibits xanthine oxidase
- ☐ Xanthine oxidase activator

Promotes excretion of uric acid

9%

Causes the depolymerisation of intracellular microtubules

4%

Uric acid chelator

5%

Inhibits xanthine oxidase

73%

Xanthine oxidase activator

9%

Allopurinol inhibits xanthine oxidase

Important for me Less important

Xanthine oxidase is responsible for the oxidation of 6-mercaptopurine to 6-thiouric acid

You are counselling a 20-year-old female who is planning to start taking the combined oral contraceptive pill. Which of the following statements is correct?

- ☐ She will still be protected against pregnancy if she takes amoxicillin for a lower respiratory tract infection while on the combined pill
- ☐ She should not take the combined pill if she has heavy periods
- ☐ She is likely to put on 2-3 kilograms of weight per year while using the combined pill
- ☐ She will not require any monitoring once she has started taking the combined pill
- ☐ There is only one type and brand of combined pill

She will still be protected against pregnancy if she takes amoxicillin for a lower respiratory tract infection while on the combined pill

48%

She should not take the combined pill if she has heavy periods

8%

She is likely to put on 2-3 kilograms of weight per year while using the combined pill

29%

She will not require any monitoring once she has started taking the combined pill

11%

There is only one type and brand of combined pill

4%

There is no evidence that antibiotics other than enzyme inducing antibiotics such as rifampicin reduce the efficacy of the combined oral contraceptive pill

Important for me Less important

It was previously advised that barrier methods of contraception should be used if taking an antibiotic while using the contraceptive pill, due to concerns that antibiotics might reduce the absorption of the pill. This is now known to be untrue. However, if the absorptive ability of the gut is compromised for another reason, such as severe diarrhoea or vomiting, or bowel disease, this may affect the efficacy of the pill.

The exception to the antibiotic rule is that hepatic enzyme-inducing antibiotics such as rifampicin and rifaximin do reduce the efficacy of the pill. Other enzyme-inducing drugs, such as phenytoin, phenobarbital, carbamazepine or St John's Wort can also reduce the effectiveness of the pill.

The other statements are not true. The combined pill is often prescribed for women with heavy periods as it can make them lighter and less painful. There is no evidence that women on the combined pill put on any significant weight, although they may experience bloating at certain times in the course. Women on the pill require monitoring of their blood pressure. There are multiple different types of combined pill.

BNF:

<https://bnf.nice.org.uk/treatment-summary/contraceptives-interactions.html>

NICE - the guide to the combined contraceptive pill:

<https://www.nhs.uk/conditions/contraception-guide/pages/combined-contraceptive-pill.aspx>

What is the mechanism of action of flecainide?

- ☐ Calcium channel blockers
- ☐ Potassium channel blocker
- ☐ Sodium channel blocker
- ☐ Potassium channel activator
- ☐ ADP receptor antagonist

Calcium channel blockers

9%

Potassium channel blocker

17%

Sodium channel blocker

61%

Potassium channel activator

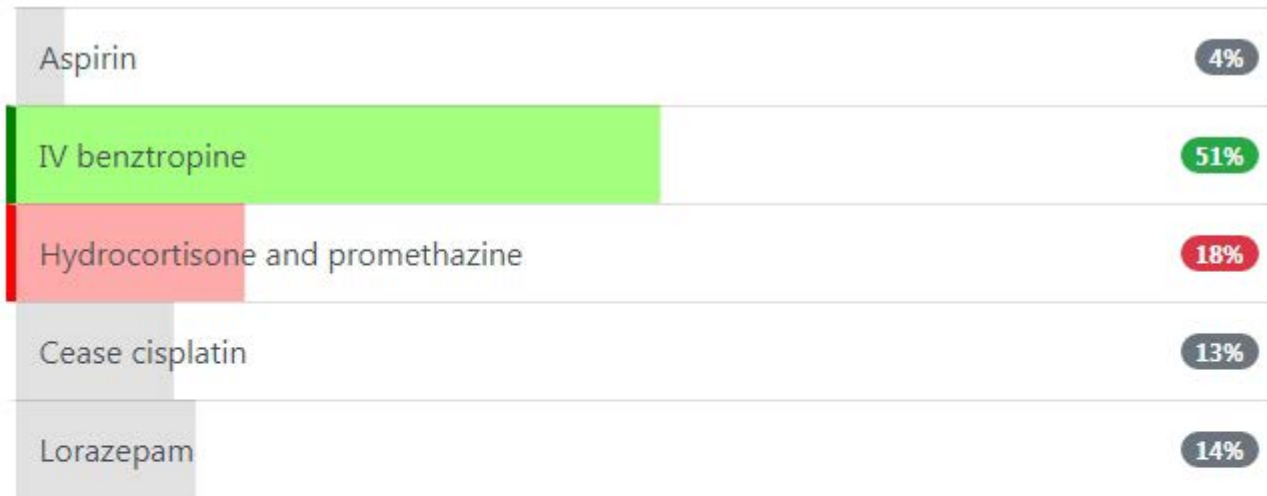
7%

ADP receptor antagonist

5%

A 29-year-old male with testicular cancer is receiving cisplatin-based chemotherapy. He has been given dexamethasone, metoclopramide and aprepitant prior to receiving chemotherapy. He is now agitated, very anxious and complaining of abnormal eye movements. What is the best immediate treatment?

- ☐ Aspirin
- ☐ IV benztropine
- ☐ Hydrocortisone and promethazine
- ☐ Cease cisplatin
- ☐ Lorazepam



An oculogyric crises, which is what the patient is experiencing, is a dystonic reaction to drugs, in particular neuroleptics and dopaminergic medications (classically metoclopramide and haloperidol) characterized by a prolonged involuntary upward deviation (bilateral elevation of the visual gaze) of the eyes. The standard remedy for this is benztropine.

A 78-year-old woman with a history of recurrent ventricular tachycardia has routine blood tests 3 months after starting amiodarone therapy:

TSH	14.5 mu/l
Free T4	8.2 pmol/l

How should her thyroid dysfunction be managed?

- ☐ Continue amiodarone and add folic acid
- ☐ Stop amiodarone and start thyroxine
- ☐ Stop amiodarone and add carbimazole and thyroxine
- ☐ Stop amiodarone and repeat bloods in 4 weeks
- ☐ Continue amiodarone and add thyroxine

Continue amiodarone and add folic acid	8%
Stop amiodarone and start thyroxine	11%
Stop amiodarone and add carbimazole and thyroxine	9%
Stop amiodarone and repeat bloods in 4 weeks	24%
Continue amiodarone and add thyroxine	48%

Patients who develop hypothyroidism whilst taking amiodarone can continue to take the drug if this is desirable. Given that this patient has a history of ventricular tachycardia it would be unwise to withdraw amiodarone abruptly

A 39-year-old woman who has recently been diagnosed with hypertension comes for review. She is sexually active but does not currently use any form of contraception other than barrier methods. Which one of the following medications should be avoided?

☐ Hydralazine

☐ Nifedipine

☐ Methyldopa

☐ Labetalol

☐ Lisinopril



When prescribing this woman should be treated as if she were pregnant given the absence of effective contraception. ACE inhibitors such as lisinopril are known teratogens and must be avoided.

NICE are very clear on this point: *'Offer antihypertensive drug treatment to women of child-bearing potential in line with the recommendations on Management of pregnancy with chronic hypertension'*

A 37-year-old man with a history of alcohol excess is admitted with alcohol-withdrawal seizures to the acute medical unit. Admission bloods show the following:

Na ⁺	137 mmol/l
K ⁺	3.0 mmol/l
Urea	2.0 mmol/l
Creatinine	78 µmol/l
Calcium	2.03 mmol/l

What other blood abnormality is he also most likely to have?

- ☐ Hypomagnesaemia
- ☐ Elevated ammonia levels
- ☐ Hypophosphataemia
- ☐ Partially compensated metabolic alkalosis
- ☐ Raised bilirubin

Hypomagnesaemia

66%

Elevated ammonia levels

7%

Hypophosphataemia

15%

Partially compensated metabolic alkalosis

8%

Raised bilirubin

5%

Which of the following relating to St John's Wort is false?

- ☐ Adverse effects in trials is similar to placebo
- ☐ May cause serotonin syndrome
- ☐ Mechanism of action is similar to selective serotonin reuptake inhibitors
- ☐ Causes inhibition of the P450 system
- ☐ Has been shown to be effective in treating mild-moderate depression

Adverse effects in trials is similar to placebo

12%

May cause serotonin syndrome

8%

Mechanism of action is similar to selective serotonin reuptake inhibitors

7%

Causes inhibition of the P450 system

64%

Has been shown to be effective in treating mild-moderate depression

9%

St John's Wort is a known inducer of the P450 system

Dr Assem

A 71-year-old man who has atrial fibrillation and heart failure is started on digoxin. What is the mechanism of action of digoxin?

- ☐ Blocks Ca^{2+} release from the sarcoplasmic reticulum
- ☐ Blocks Na^{+} entry into myocytes
- ☐ Agonist of the myocyte sodium-calcium exchanger
- ☐ K^{+} channel blocker
- ☐ Inhibits the $\text{Na}^{+}/\text{K}^{+}$ ATPase pump

Blocks Ca^{2+} release from the sarcoplasmic reticulum

10%

Blocks Na^{+} entry into myocytes

8%

Agonist of the myocyte sodium-calcium exchanger

10%

K^{+} channel blocker

9%

Inhibits the $\text{Na}^{+}/\text{K}^{+}$ ATPase pump

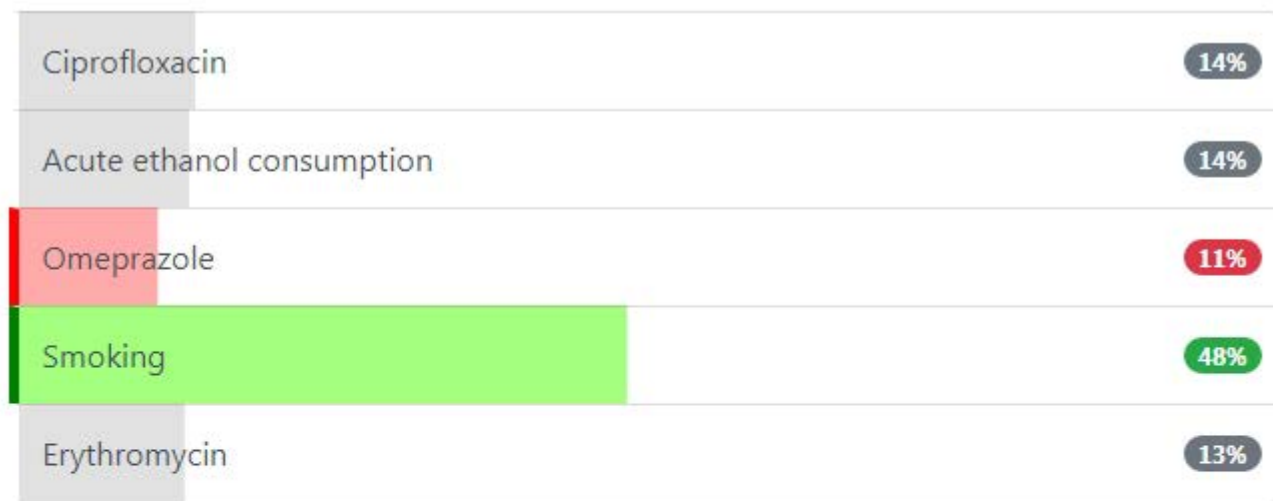
64%

Digoxin - inhibits the $\text{Na}^{+}/\text{K}^{+}$ ATPase pump

Important for me Less important

Which of the following may reduce the action of aminophylline in patients?

- ☐ Ciprofloxacin
- ☐ Acute ethanol consumption
- ☐ Omeprazole
- ☐ Smoking
- ☐ Erythromycin



Smoking is a P450 enzyme inducer

Important for me Less important

Smoking is known to induce CYP1A2 isoenzyme, reducing the effectiveness of aminophylline

A 49-year-old homeless gentleman is brought to the emergency department with a reduced glasgow coma scale of 14/15.

His pupils are equal but poorly reactive to light and he is complaining of poor eyesight.

An ABG is performed.

pH	7.21
pO ₂	12.3 kPa
pCO ₂	4.7 kPa
HCO ₃ ⁻	14 mmol/l
Na ⁺	140 mmol/l
K ⁺	3.6 mmol/l
Cl ⁻	102 mmol/l
Lactate	2.3 mmol/l

Which substance is he most likely to have ingested?

- ☐ Aspirin
- ☐ Alcohol
- ☐ Methanol
- ☐ Amitriptyline
- ☐ Ethylene glycol

Aspirin	12%
Alcohol	6%
Methanol	52%
Amitriptyline	7%
Ethylene glycol	22%

This is a common MRCP question.

The inclusion of an ABG with a metabolic acidosis invites the reader to calculate the anion gap.

In this case $\{[Na^{+}] + [K^{+}]\} - \{[HCO_3^{-}] + [Cl^{-}]\} = 27.6 \text{ mmol/l}$

A raised anion gap metabolic acidosis - all of the possible answers here may produce this picture.

As this man is homeless and we are given no further information the most likely causes for his presentation are alcohol, methanol and ethylene glycol (anti-freeze).

The answer here is indicated by the reduced vision and poorly reactive pupils - a common complication of methanol poisoning. A metabolite of methanol, formic acid, accumulates in the optic nerve causing visual disturbance and eventually blindness.

Alcohol and ethylene glycol would not produce these visual changes.

Aspirin overdose might also be associated with a respiratory alkalosis - not seen here. Despite the limited information this presentation does not suggest tricyclic overdose - you would expect dilated pupils and a history of depression.

What is the most common adverse effect experienced by women taking the progestogen only pill?

☐ Irregular vaginal bleeding

☐ Acne

☐ Mood swings

☐ Reduced libido

☐ Weight gain

Irregular vaginal bleeding

54%

Acne

10%

Mood swings

10%

Reduced libido

7%

Weight gain

19%

Dr. Ssem

A 16-year-old girl is admitted to the Emergency Department late on a Friday night. She is complaining of palpitations and feeling 'unwell'. Her friends state that she has had a bad reaction to the alcohol they've been drinking and deny the use of any illicit substances. On examination she is agitated and clutching her chest. Her pupils are mydriatic and the pulse rate is 108/min, blood pressure 130/90 mmHg. She says that she is going to be sick. Which of the following substances may account for this presentation?

☐ Cannabis

☐ Cocaine

☐ LSD

☐ Heroin

☐ Ketamine

Cannabis

9%

Cocaine

64%

LSD

13%

Heroin

6%

Ketamine

8%

Which one of the following drugs is most likely to cause impaired glucose tolerance?

- ☐ Bezafibrate
- ☐ Simvastatin
- ☐ Nicotinic acid
- ☐ Cholestyramine
- ☐ Gemfibrozil

Bezafibrate

17%

Simvastatin

10%

Nicotinic acid

46%

Cholestyramine

14%

Gemfibrozil

13%

Glycaemic control in diabetes may be worsened by nicotinic acid

Important for me Less important

What is the most appropriate time to take blood samples for therapeutic monitoring of ciclosporin levels?

☐ 6 hours after last dose

☐ Immediately before next dose

☐ At any time

☐ 12 hours after last dose

☐ 4 hours after last dose

6 hours after last dose

15%

Immediately before next dose

51%

At any time

7%

12 hours after last dose

20%

4 hours after last dose

7%

Which one of the following adrenoceptors cause vasoconstriction and relaxation of GI muscle in response to sympathetic stimulation?

☐ Alpha-1

☐ Alpha-2

☐ Beta-1

☐ Beta-2

☐ Beta-3

Alpha-1

49%

Alpha-2

23%

Beta-1

9%

Beta-2

11%

Beta-3

7%

A 65-year-old man presents to the Emergency Department with lethargy and leg swelling. Initial bloods show the following:

Na+	138 mmol/l
K+	5.6 mmol/l
Urea	19.3 mmol/l
Creatinine	299 μ mol/l

His renal function six months ago was normal. Which one of his regular medications is it most important to stop straight away?

- ☐ Ibuprofen
- ☐ Warfarin
- ☐ Paracetamol
- ☐ Diazepam
- ☐ Atenolol



NSAIDs such as ibuprofen can significantly worsen renal impairment and must be avoided in patients with acute kidney injury or chronic kidney disease.

Doxazosin is a:

- ☐ Alpha-1 antagonist
- ☐ Alpha-1 agonist
- ☐ Non-selective alpha antagonist
- ☐ Alpha-2 agonist
- ☐ Alpha-2 antagonist

Alpha-1 antagonist

59%

Alpha-1 agonist

18%

Non-selective alpha antagonist

8%

Alpha-2 agonist

7%

Alpha-2 antagonist

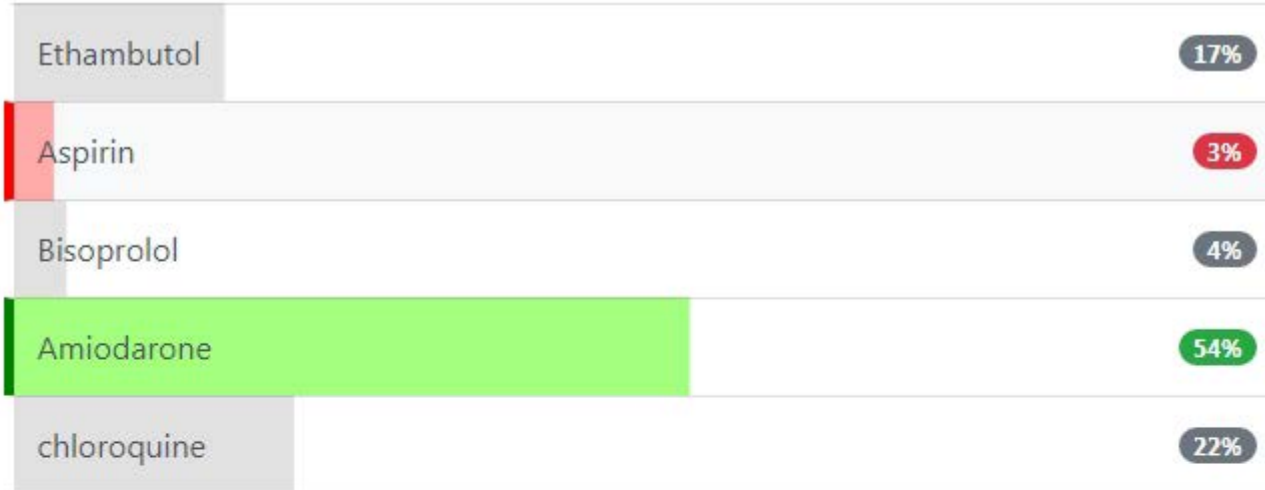
8%

Doxazosin is an alpha-1 adrenoceptor antagonist used in the treatment of hypertension and benign prostatic hypertrophy

A 58-year-old male patient presents to the ophthalmology with deteriorating vision. He reports a 6-months history of gradually worsening blurred vision. His past medical history includes a history of ventricular tachycardia, angina, hypertension, hypercholesterolaemia, type 2 diabetes mellitus and recent malaria. Slit-lamp examination reveals bilateral diffuse corneal opacity.

What is the most likely medication to have caused this clinical picture?

- ☐ Ethambutol
- ☐ Aspirin
- ☐ Bisoprolol
- ☐ Amiodarone
- ☐ chloroquine



Amiodarone can cause corneal opacities

Important for me Less important

Amiodarone is the only medication from the options to be known to cause corneal opacification.

Aspirin and bisoprolol are not known to cause corneal opacification.

Ethambutol can cause optic neuritis but corneal opacification is unusual.

Chloroquine can cause retinopathy but corneal opacification is unusual.

Which one of the following features is least associated with ecstasy poisoning?

☐ Rhabdomyolysis

☐ Hyperthermia

☐ Ataxia

☐ Hypertension

☐ Hypernatraemia



Ecstasy is thought to stimulate the production of anti-diuretic hormone. Users of ecstasy also commonly drink too much water in the (mistaken) belief that this will protect them from the adverse effects.

Of the following, which one is the most useful prognostic marker in paracetamol overdose?

- ☐ ALT
- ☐ Prothrombin time
- ☐ Paracetamol levels at presentation
- ☐ Paracetamol levels at 12 hours
- ☐ Paracetamol levels at 24 hours

ALT	10%
Prothrombin time	69%
Paracetamol levels at presentation	7%
Paracetamol levels at 12 hours	7%
Paracetamol levels at 24 hours	6%

An elevated prothrombin time signifies liver failure in paracetamol overdose and is a marker of poor prognosis. However, arterial pH, creatinine and encephalopathy are also markers of a need for liver transplantation

What is the mechanism of action of heparin?

- ☐ Activates antithrombin III
- ☐ Vitamin K antagonist
- ☐ Activates tissue plasminogen activator
- ☐ Inhibits antithrombin III
- ☐ Inhibits protein C

Activates antithrombin III

62%

Vitamin K antagonist

4%

Activates tissue plasminogen activator

5%

Inhibits antithrombin III

25%

Inhibits protein C

4%

Dr Asseini

A 44-year-old Bangladeshi man with a history of mitral stenosis and atrial fibrillation is diagnosed with tuberculosis. He is commenced on anti-tuberculosis therapy. Three weeks after starting treatment his INR has increased to 5.6. Which one of the following medications is most likely to be responsible for this increase?

☐ Pyrazinamide

☐ Isoniazid

☐ Rifampicin

☐ Ethambutol

☐ Streptomycin

Pyrazinamide

6%

Isoniazid

48%

Rifampicin

35%

Ethambutol

5%

Streptomycin

7%

Isoniazid **inhibits** the P450 system

Important for me [Less important](#)

It is important when answering questions relating to liver enzymes to be sure whether the question is asking about induction or inhibition. Drugs causing induction are often well known and candidates may rush to give these as the answer. A raised INR is a result of **inhibited** liver enzymes

What is the mechanism of action of tacrolimus?

- ☐ Mercaptopurine antagonist
- ☐ Interferes with purine synthesis
- ☐ Inhibits inosine monophosphate dehydrogenase
- ☐ Monoclonal antibody against IL-2 receptor
- ☐ Decreases IL-2 release by inhibiting calcineurin

Mercaptopurine antagonist

7%

Interferes with purine synthesis

10%

Inhibits inosine monophosphate dehydrogenase

6%

Monoclonal antibody against IL-2 receptor

14%

Decreases IL-2 release by inhibiting calcineurin

64%

A 54-year-old obese man presents with lethargy and polyuria. A fasting blood sugar is requested:

Fasting glucose	8.4 mmol/l
-----------------	------------

He is given dietary advice and a decision is made to start metformin. What is the most appropriate prescription?

- ☐ Metformin 500mg od with food for 5 days then metformin 500mg bd for 5 days then metformin 500mg tds for 20 days then review
- ☐ Metformin 500mg tds with food
- ☐ Metformin 500mg od with food for 14 days then metformin 500mg bd for 14 days then review
- ☐ Metformin 1g tds with food
- ☐ Metformin 500mg tds taken at least 1 hour before meals

Metformin 500mg od with food for 5 days then metformin 500mg bd for 5 days then metformin 500mg tds for 20 days then review

20%

Metformin 500mg tds with food

8%

Metformin 500mg od with food for 14 days then metformin 500mg bd for 14 days then review

62%

Metformin 1g tds with food

3%

Metformin 500mg tds taken at least 1 hour before meals

7%

Metformin should be titrated slowly, leave at least 1 week before increasing dose

Important for me Less important

Gastrointestinal side-effects are more likely to occur if metformin is not slowly titrated up. The BNF advises leaving at least 1 week before increasing the dose.

A 43-year-old man with a history of bipolar disorder is admitted with acute confusion. Whilst being transferred to hospital he had generalised seizure which terminated spontaneously after around 30 seconds. On arrival in the Emergency Department his GCS is 14/15 and he is noted to have a coarse tremor. A diagnosis of lithium toxicity is suspected. Intravenous access is obtained, bloods are taken and a saline infusion is started. Blood results reveal the following:

Lithium level	4.2 mmol/l
Na ⁺	136 mmol/l
K ⁺	4.6 mmol/l
Urea	8.1 mmol/l
Creatinine	99 µmol/l
Bicarbonate	18 mmol/l

What is the most appropriate management?

- ☐ Arrange haemodialysis
- ☐ Intravenous magnesium
- ☐ Intravenous bicarbonate
- ☐ Intravenous hypertonic saline
- ☐ Arrange plasma exchange

Arrange haemodialysis

54%

Intravenous magnesium

6%

Intravenous bicarbonate

27%

Intravenous hypertonic saline

7%

Arrange plasma exchange

7%

The high lithium level and reduced GCS are an indication for haemodialysis in this patient.

A 62-year-old man is commenced on finasteride for symptoms of bladder outflow obstruction. Which one of the following adverse effects is most associated with this treatment?

- ☐ Alopecia
- ☐ Gynaecomastia
- ☐ Prostate cancer
- ☐ Increased levels of serum prostate specific antigen
- ☐ Postural hypotension

Alopecia

5%

Gynaecomastia

54%

Prostate cancer

4%

Increased levels of serum prostate specific antigen

11%

Postural hypotension

25%

You are working in oncology. You are reviewing a 55-year-old woman in clinic with Stage IVb metastatic melanoma. Her disease has spread to her liver, lungs and her brain. Her BRAF status is negative. She has been treated with a combination of nivolumab and ipilimumab for the last four months with a good response. Her recent re-staging CT scan showed no new sites of disease and a good reduction in tumour size. However in the last four weeks she has felt particularly low in mood and complains that she often feels fatigued and lacking energy. She has also complained of a vague intermittent abdominal discomfort. What would be your first investigation?

- ☐ Thyroid function tests
- ☐ Screen the patient for depression
- ☐ MRI of the brain
- ☐ Synacthen test
- ☐ CT of the abdomen and pelvis

Thyroid function tests

39%

Screen the patient for depression

15%

MRI of the brain

8%

Synacthen test

22%

CT of the abdomen and pelvis

17%

Nivolumab (PD-1 inhibitor) and ipilimumab (CTLA-4 inhibitor) are checkpoint inhibitors which are used in the treatment of metastatic melanoma. Effects on the endocrine system are being increasingly reported with prolonged therapy (hypophysitis and hypothyroidism) and therefore it is important to assess patients carefully who present with symptoms of hypothyroidism whilst on these drugs. Answer 2 is not unreasonable but an organic cause for her symptoms must be ruled out first. The vague abdominal discomfort may be constipation related to the hypothyroidism although many other causes in someone with metastatic malignancy could be associated. Even so, answer 5 should not be the first investigation. Even though the cancer is responding to treatment the patient has new symptoms which should warrant investigation. Answer 3 is wrong; an MRI is not indicated here. Answer 4 is to test for Addison's disease which is incorrect in this scenario.

A 25-year-old woman is diagnosed with a urinary tract infection. She has a past history of epilepsy and is currently taking sodium valproate. Which one of the following antibiotics should be avoided if possible

- ☐ Co-amoxiclav
- ☐ Nitrofurantoin
- ☐ Cefixime
- ☐ Trimethoprim
- ☐ Ciprofloxacin



Ciprofloxacin lowers the seizure threshold

Important for me Less important

Whilst many antibiotics can lower the seizure threshold, this effect is seen particularly with quinolones. The BNF advises that quinolones 'should be used with caution in patients with a history of epilepsy, or conditions that predispose to seizures'

A 21-year-old woman presents to the emergency department with confusion, agitation and sweating. Her friends report she has taken an unknown quantity of ecstasy (3,4-Methylenedioxymethamphetamine, MDMA) approximately two hours ago. She is taking sertraline for depression, but has no other past medical history. She has no known drug allergies.

Neurological examination reveals globally increased muscle tone, hyperreflexia and clonus. Her tympanic membrane temperature is 41.2° C.

Which management strategy would be most appropriate?

- ☐ Cyproheptadine
- ☐ Piperacillin/Tazobactam
- ☐ Lipid emulsion therapy
- ☐ Alteplase
- ☐ Dimercaprol

Cyproheptadine

47%

Piperacillin/Tazobactam

5%

Lipid emulsion therapy

24%

Alteplase

4%

Dimercaprol

21%

SSRIs + MDMA = higher risk of serotonin syndrome

Important for me Less important

This is serotonin syndrome. The combination of two or more serotonergic medications greatly increases the risk: in this case an selective serotonin uptake inhibitor (sertraline) and MDMA. Cyproheptadine is an H1 and nonspecific 5HT antagonist, recommended for treatment of severe serotonin syndrome. Piperacillin/tazobactam is a broad spectrum beta-lactam antibiotic, often used to treat sepsis. Lipid emulsion therapy is used in local anaesthetic toxicity and may also be considered in tricyclic overdose. Alteplase is the thrombolytic agent most commonly used in acute stroke. Dimercaprol is used in heavy metal poisoning.

A 23-year-old man is admitted to the emergency department after being found by his friends 'collapsed' in the bathroom at a house party. On admission he is initially incoherent and combative but settles following diazepam. Thirty minutes after admission he remains tachycardic with a pulse of 108/min, blood pressure 144/90 mmHg and temperature 37.3°C. You are asked to review him again as he is complaining of severe abdominal pain. He also reports passing some blood in his stool (which was looser than normal) when he went to the toilet 5 minutes ago.

What is the single most likely cause of his abdominal pain?

- ☐ Bleeding duodenal ulcer
- ☐ Haemorrhagic pancreatitis
- ☐ Ischaemic colitis
- ☐ Disseminated intravascular coagulation
- ☐ Ruptured aortic abdominal aorta

Bleeding duodenal ulcer

10%

Haemorrhagic pancreatitis

7%

Ischaemic colitis

74%

Disseminated intravascular coagulation

3%

Ruptured aortic abdominal aorta

5%

Ischaemic colitis is a recognised phenomenon following cocaine ingestion and should be considered if patients develop abdominal pain or rectal bleeding.

A 59-year-old man with a known history of type 2 diabetes mellitus, atrial fibrillation and epilepsy presents as he is feeling generally unwell. His main complaint is a blue tinge to his vision. Which one of his medications is most likely to be responsible?

- ☐ Phenytoin
- ☐ Metformin
- ☐ Sildenafil
- ☐ Pioglitazone
- ☐ Digoxin

Phenytoin

7%

Metformin

3%

Sildenafil

74%

Pioglitazone

4%

Digoxin

11%

Visual changes secondary to drugs

- blue vision: Viagra ('the blue pill')
- yellow-green vision: digoxin

Important for me Less important

A 62-year-old male with a history of type 2 diabetes mellitus is investigated for lethargy. Blood tests are as follows:

Na ⁺	139 mmol/l
K ⁺	4.2 mmol/l
Bicarbonate	15 mmol/l
Chloride	105 mmol/l
Urea	15.2 mmol/l
Creatinine	267 µmol/l
Glucose	9.2 mmol/l

Which one of the following is most likely to be contributing to the low bicarbonate value?

- ☐ Vomiting due to gastroparesis
- ☐ Renal tubular acidosis
- ☐ Addison's disease
- ☐ Metformin
- ☐ Rosiglitazone

Dr Assem

Vomiting due to gastroparesis

12%

Renal tubular acidosis

29%

Addison's disease

5%

Metformin

46%

Rosiglitazone

9%

Although rare, lactic acidosis is an important side-effect of metformin

Important for me Less important

Whilst the decreased bicarbonate value may be worsened by deteriorating renal function, it is important to exclude lactic acidosis secondary to metformin.

The raised anion gap is against a diagnosis of renal tubular acidosis.

Which one of the following is a mixed alpha and beta adrenoceptor antagonist?

- ☐ Doxazosin
- ☐ Phenoxybenzamine
- ☐ Yohimbine
- ☐ Propranolol
- ☐ Carvedilol

Doxazosin

9%

Phenoxybenzamine

20%

Yohimbine

13%

Propranolol

12%

Carvedilol

46%

A 18-year-old male is admitted after deliberately ingesting 40 grams of paracetamol. Twenty-four hours after admission he is reassessed with a view to liver transplantation. Of the following, which one would most strongly indicate the need for a liver transplant?

- ☐ CRP 306
- ☐ Arterial pH 7.25
- ☐ Creatinine 267 $\mu\text{mol/l}$
- ☐ Grade IV encephalopathy
- ☐ INR 5.7

CRP 306

3%

Arterial pH 7.25

57%

Creatinine 267 $\mu\text{mol/l}$

4%

Grade IV encephalopathy

25%

INR 5.7

11%

The arterial pH is the single most important factor. The creatinine, encephalopathy grade and INR must all be grossly abnormal otherwise

Which one of the following pairs of features would be expected to occur following administration of an anticholinesterase (acetylcholinesterase inhibitor)?

- ☐ Bradycardia and miosis
- ☐ Bradycardia and urinary retention
- ☐ Tachycardia and diarrhoea
- ☐ Bradycardia and mydriasis
- ☐ Tachycardia and lacrimation

Bradycardia and miosis	39%
Bradycardia and urinary retention	17%
Tachycardia and diarrhoea	11%
Bradycardia and mydriasis	21%
Tachycardia and lacrimation	12%

Organophosphate insecticide poisoning - bradycardia

Important for me Less important

A clinical example of an anticholinesterase is organophosphate compounds

A 71-year-old man is prescribed digoxin for new onset atrial fibrillation. His doctor explains that the full effect will not be seen for one week. Which one of the following is responsible for this delayed effect?

- ☐ Clearance
- ☐ Volume of distribution
- ☐ Absorption
- ☐ First pass metabolism
- ☐ Half-life

Clearance

5%

Volume of distribution

32%

Absorption

6%

First pass metabolism

19%

Half-life

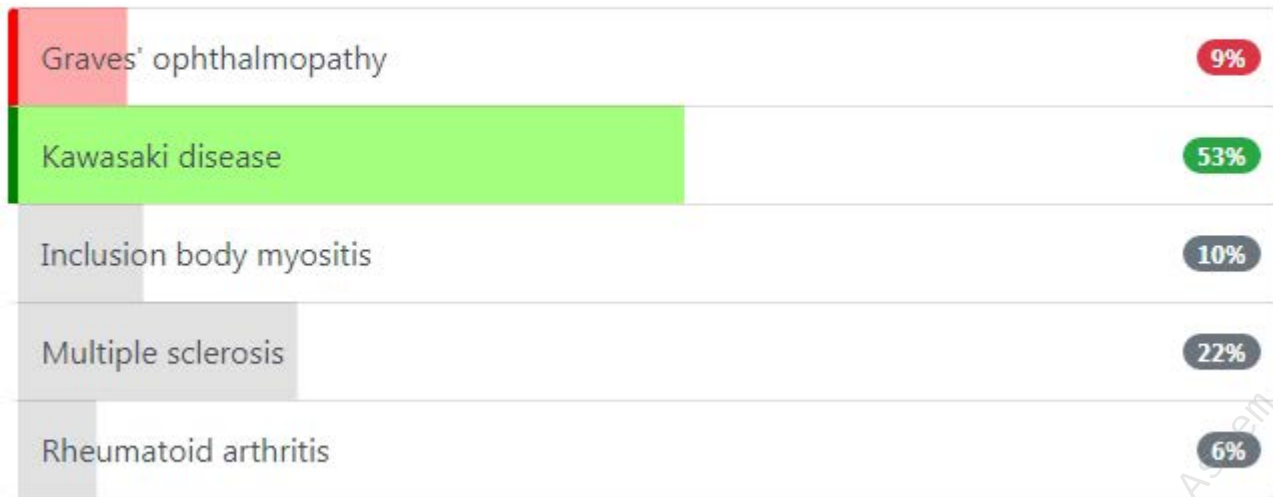
38%

The half-life of digoxin is around 36-48 hours. This results in a delay before steady plasma levels are seen

In which one of the following conditions is intravenous immunoglobulin therapy most likely to be beneficial?

- ☐ Graves' ophthalmopathy
- ☐ Kawasaki disease
- ☐ Inclusion body myositis
- ☐ Multiple sclerosis
- ☐ Rheumatoid arthritis

In which one of the following conditions is intravenous immunoglobulin therapy most likely to be beneficial?

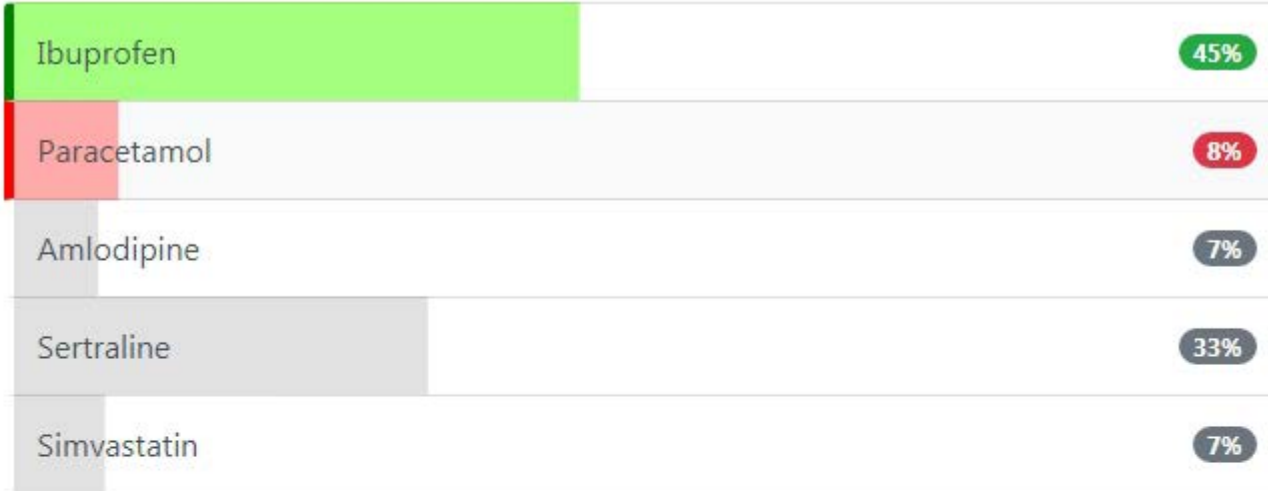


A 27-year-old female patient presents to the emergency department with a 4-day history of a rash. She reports having taken an overdose of a medication 1 day prior to the rash developing but she refuses to say what she took. She has no past medical history of note but has a history of recurrent depression and previous overdose. No family history of note. On presentation, her observations are: heart rate 56 beats per minute, blood pressure of 127/72 mmHg, respiratory rate 18 breaths per minute, oxygen saturation 100% on air. On examination, you note a generalised non-blanching petechial rash. Blood results are as follows.

Na ⁺	134 mmol/L
K ⁺	4.8 mmol/L
Hb	130 g/L
Platelet	$75 \times 10^9/L$

Which is the most likely medication she took?

- ☐ Ibuprofen
- ☐ Paracetamol
- ☐ Amlodipine
- ☐ Sertraline
- ☐ Simvastatin



NSAIDs are a cause of thrombocytopenia

Important for me Less important

This patient has evidence of thrombocytopenia, likely secondary to NSAIDs.

Paracetamol, amlodipine, sertraline and simvastatin do not usually cause thrombocytopenia.

Dr Assem

Which one of the following enzymes is involved in phase I drug metabolism?

- ☐ UDP-glucuronosyl transferases
- ☐ Pyruvate carboxylase
- ☐ Succinic dehydrogenase
- ☐ N-acetyl transferases
- ☐ Alcohol dehydrogenase

UDP-glucuronosyl transferases

16%

Pyruvate carboxylase

13%

Succinic dehydrogenase

6%

N-acetyl transferases

15%

Alcohol dehydrogenase

51%

A 29-year-old woman is admitted to the Emergency Department with carbon monoxide poisoning. High-flow oxygen is applied on arrival. Which one of the following is not an indication for hyperbaric oxygen therapy?

- ☐ A carboxyhaemoglobin concentration of 16%
- ☐ Arrhythmia
- ☐ Extrapyrarnidal features
- ☐ Loss of consciousness when initially found by paramedics
- ☐ Pregnancy

A carboxyhaemoglobin concentration of 16%

47%

Arrhythmia

8%

Extrapyramidal features

10%

Loss of consciousness when initially found by paramedics

14%

Pregnancy

22%

Heavy smokers may have a carboxyhaemoglobin concentration of 10-15%

Which one of the following is not a recognised side-effects of dopamine receptor agonists?

☐ Postural hypotension

☐ Daytime somnolence

☐ Galactorrhoea

☐ Nausea

☐ Hallucinations

Postural hypotension

13%

Daytime somnolence

12%

Galactorrhoea

51%

Nausea

12%

Hallucinations

12%

A 54-year-old female is being investigated for a macrocytic anaemia. Bloods test reveal a low vitamin B12 level. Which one of the following medications may be contributing to this?

☐ Bendroflumethiazide

☐ Digoxin

☐ Amiodarone

☐ Sodium valproate

☐ Metformin

Bendroflumethiazide

7%

Digoxin

4%

Amiodarone

12%

Sodium valproate

29%

Metformin

47%

A 30-year-old male is admitted to the medical ward with fever, rigors, confusion and vomiting. He is found to have a low neutrophil count and is started on treatment for neutropenic sepsis. He had recently been started on a new anti-epileptic medication. Which of these medications is most likely to be the cause?

- ☐ Topiramate
- ☐ Lacosamide
- ☐ Carbamazepine
- ☐ Phenytoin
- ☐ Levetiracetam

Topiramate	8%
Lacosamide	5%
Carbamazepine	52%
Phenytoin	28%
Levetiracetam	7%

Carbamazepine can cause agranulocytosis

Important for me Less important

The correct answer is carbamazepine. Valproate is also associated with agranulocytosis. The other anti-epileptics are not classically known to cause agranulocytosis.

BNF

<https://bnf.nice.org.uk/drug/carbamazepine.html>

Dr Assem

Which one of the following statements regarding metformin is false?

- ☐ Does not cause hypoglycaemia
- ☐ Increases insulin sensitivity
- ☐ Decreases hepatic gluconeogenesis
- ☐ Increases endogenous insulin secretion
- ☐ Reduces GI absorption of carbohydrates

Does not cause hypoglycaemia

6%

Increases insulin sensitivity

5%

Decreases hepatic gluconeogenesis

7%

Increases endogenous insulin secretion

64%

Reduces GI absorption of carbohydrates

18%

Sulphonylureas have the property of increasing endogenous insulin secretion

Dr Assem

A 34-year-old man with a history of bipolar disorder is admitted with acute confusion. Lithium levels confirm the clinical diagnosis of lithium toxicity. A decision is made to give sodium bicarbonate. What is the mechanism of action of sodium bicarbonate in this situation?

- ☐ Reduce gastrointestinal tract absorption
- ☐ Myocardial stabiliser
- ☐ Neutralises lithium ions
- ☐ Central nervous system membrane stabiliser
- ☐ Increases urine alkalinity

Reduce gastrointestinal tract absorption

5%

Myocardial stabiliser

7%

Neutralises lithium ions

11%

Central nervous system membrane stabiliser

8%

Increases urine alkalinity

69%

Increasing the alkalinity of the urine promotes lithium excretion. The preferred treatment in severe cases would be haemodialysis

A 54-year-old man who had a renal transplant two years ago is reviewed in clinic. He is currently taking a combination of ciclosporin and mycophenolate as immunosuppressive therapy. Two weeks ago he was discharged on oral fluconazole after inpatient treatment for a fungal pneumonia. His creatinine level has increased from 114 $\mu\text{mol/l}$ before hospital admission to 187 $\mu\text{mol/l}$ today. What is the most likely factor contributing to this rise?

- ☐ Amphotericin-B induced membranous glomerulonephritis
- ☐ Ciclosporin nephrotoxicity
- ☐ 5-fluorocytosine induced minimal change glomerulonephritis
- ☐ Mycophenolate nephrotoxicity
- ☐ Fluconazole nephrotoxicity

Amphotericin-B induced membranous glomerulonephritis

12%

Ciclosporin nephrotoxicity

59%

5-fluorocytosine induced minimal change glomerulonephritis

5%

Mycophenolate nephrotoxicity

8%

Fluconazole nephrotoxicity

17%

Ciclosporin may cause nephrotoxicity

Important for me Less important

Fluconazole inhibits the metabolism of ciclosporin which increases the risk of ciclosporin nephrotoxicity.

Which one of the following statements regarding heparin-induced thrombocytopenia (HIT) is correct?

- ☐ A fall in the platelet count of greater than 15% is diagnostic
- ☐ HIT is a prothrombotic condition
- ☐ Tranexamic acid is the treatment of choice
- ☐ HIT usually develops with 2-3 days of starting treatment
- ☐ HIT is more common with low-molecular weight heparin than with unfractionated heparin

A fall in the platelet count of greater than 15% is diagnostic

9%

HIT is a prothrombotic condition

55%

Tranexamic acid is the treatment of choice

6%

HIT usually develops with 2-3 days of starting treatment

17%

HIT is more common with low-molecular weight heparin than with unfractionated heparin

13%

What is the mechanism of action of macrolides?

- ☐ Causes misreading of mRNA
- ☐ Interferes with cell wall formation
- ☐ Inhibits DNA synthesis
- ☐ Inhibits RNA synthesis
- ☐ Inhibits protein synthesis

What is the mechanism of action of macrolides?

Causes misreading of mRNA

4%

Interferes with cell wall formation

9%

Inhibits DNA synthesis

11%

Inhibits RNA synthesis

9%

Inhibits protein synthesis

67%

Macrolides - inhibits protein synthesis by acting on the 50S subunit of ribosomes

Important for me Less important

A 21-year-old patient with long-term pins and needles in both hands and a protruded lower jaw develops right upper quadrant pain after being started on a new medication for his condition, which medications acting on his endocrine system is responsible for this adverse effect?

- ☐ Octreotide
- ☐ Bromocriptine
- ☐ Desmopressin
- ☐ Metformin
- ☐ Levothyroxine

Octreotide	55%
Bromocriptine	25%
Desmopressin	7%
Metformin	8%
Levothyroxine	5%

Biliary stasis and subsequently gallstones is a common adverse effect of octreotide

Important for me Less important

Octreotide is a somatostatin analogue, which is known to inhibit hepatic bile secretion and gallbladder emptying leading to biliary stasis and subsequently an increased risk of developing gallstones.

Bromocriptine - a dopamine agonist with side effects arising from its stimulation of the brain vomiting centre

Desmopressin - predominantly used in patients with diabetes insipidus by increasing the presence of aquaporin channels in the distal collecting duct to increase water reabsorption from the kidneys. Main side effects include headache and facial flushing due to hypertension.

Metformin - mainly reduces hepatic gluconeogenesis in patients with type 2 diabetes, common side effects include diarrhoea, vomiting and lactic acidosis

Levothyroxine - synthetic thyroxine used in patients with hypothyroidism, common side effects result from incorrect dosing and mimic the symptoms of hyperthyroidism.

A 45-year-old woman presents to you with ongoing constipation. This started about 3 weeks ago after she was started on a new medication by her cardiologist. She is clearly not happy and blames him for it. She has a past medical history of hypertension, atrial fibrillation and psoriasis.

Which one of the following drug may be responsible for her presentation?

- ☐ Warfarin
- ☐ Bisoprolol
- ☐ Omeprazole
- ☐ Verapamil
- ☐ Clindamycin

Submit answer

Dr Assem

Warfarin	6%
Bisoprolol	15%
Omeprazole	10%
Verapamil	63%
Clindamycin	6%

Verapamil can cause constipation

Important for meLess important

Drug	Adverse effect
Beta-blockers	Cold peripheries, sleep disturbances, bronchospasm (contraindicated in asthmatics)
Calcium channel blockers	Ankle oedema, constipation, dyspepsia (relax lower oesophageal sphincter)
Clindamycin	C.diff, joint pain, heartburn
Warfarin	severe bleeding, red or brown urine, black or bloody stools, stomach pain
Omeprazole	diarrhoea, fever, cold symptoms and headache

Discuss

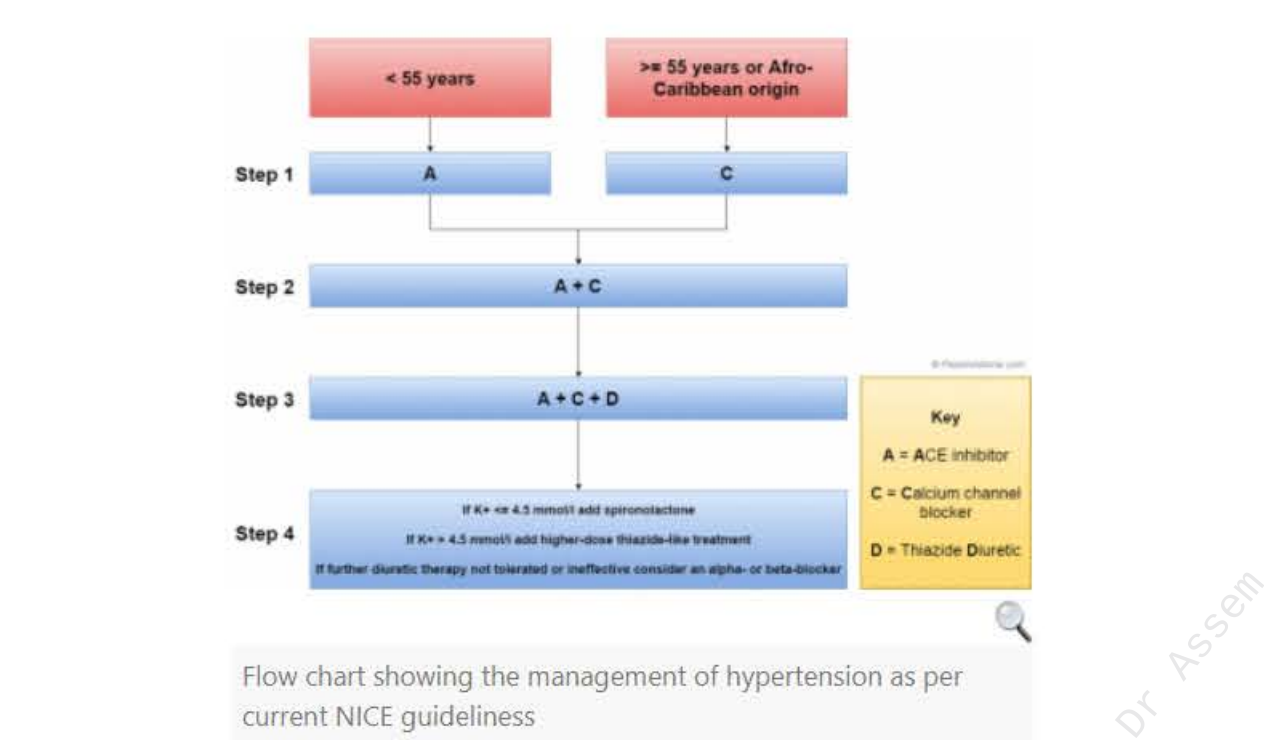
Improve

Next question >

Calcium channel blockers

Calcium channel blockers are primarily used in the management of cardiovascular disease. Voltage-gated calcium channels are present in myocardial cells, cells of the conduction system and those of the vascular smooth muscle. The various types of calcium channel blockers have varying effects on these three areas and it is therefore important to differentiate their uses and actions.

Examples	Indications & notes	Side-effects and cautions
Verapamil	Angina, hypertension, arrhythmias Highly negatively inotropic Should not be given with beta-blockers as may cause heart block	Heart failure, constipation, hypotension, bradycardia, flushing
Diltiazem	Angina, hypertension Less negatively inotropic than verapamil but caution should still be exercised when patients have heart failure or are taking beta-blockers	Hypotension, bradycardia, heart failure, ankle swelling
Nifedipine, amlodipine, felodipine (dihydropyridines)	Hypertension, angina, Raynaud's Affects the peripheral vascular smooth muscle more than the myocardium and therefore do not result in worsening of heart failure	Flushing, headache, ankle swelling



Which of the following conditions may not be treated by dopamine receptor agonists?

- ☐ Parkinson's disease
- ☐ Prolactinoma
- ☐ Nausea
- ☐ Cyclical breast disease
- ☐ Acromegaly

Submit answer

Dr Assem

Parkinson's disease	8%
Prolactinoma	15%
Nausea	43%
Cyclical breast disease	17%
Acromegaly	17%




 Discuss (2)

 Improve

Next question >

Dopamine receptor agonists

Indications

- Parkinson's disease
- prolactinoma/galactorrhoea
- cyclical breast disease
- acromegaly

Currently accepted practice in the management of patients with Parkinson's disease is to delay treatment until the onset of disabling symptoms and then to introduce a dopamine receptor agonist. If the patient is elderly, L-dopa is sometimes used as an initial treatment

Overview

- e.g. bromocriptine, ropinirole, cabergoline, apomorphine
- ergot-derived dopamine receptor agonists (bromocriptine, cabergoline, pergolide*) have been associated with pulmonary, retroperitoneal and cardiac fibrosis. The Committee on Safety of Medicines advice that an ESR, creatinine and chest x-ray should be obtained prior to treatment and patients should be closely monitored

Adverse effects

- nausea/vomiting
- postural hypotension
- hallucinations
- daytime somnolence

*pergolide was withdrawn from the US market in March 2007 due to concern regarding increased incidence of valvular dysfunction

The INR of a patient who has recently started treatment for tuberculosis drops from 2.6 to 1.3. Which one of the following medications is most likely to be responsible?

- ☐ Rifampicin
- ☐ Streptomycin
- ☐ Ethambutol
- ☐ Isoniazid
- ☐ Pyrazinamide

Submit answer

Dr Assem

The INR of a patient who has recently started treatment for tuberculosis drops from 2.6 to 1.3. Which one of the following medications is most likely to be responsible?

Rifampicin	61%
Streptomycin	6%
Ethambutol	6%
Isoniazid	21%
Pyrazinamide	6%

Rifampicin is a P450 enzyme inductor

Important for me Less important

Rifampicin is a P450 enzyme inducer and will therefore increase the metabolism of warfarin, therefore decreasing the INR.

   Discuss (1)  Improve

Next question >

P450 enzyme system

Induction usually requires prolonged exposure to the inducing drug, as opposed to P450 inhibitors, where effects are often seen rapidly

Inducers of the P450 system include

- antiepileptics: phenytoin, carbamazepine
- barbiturates: phenobarbitone
- rifampicin
- St John's Wort
- chronic alcohol intake
- griseofulvin
- smoking (affects CYP1A2, reason why smokers require more aminophylline)

Inhibitors of the P450 system include

- antibiotics: ciprofloxacin, erythromycin
- isoniazid
- cimetidine, omeprazole
- amiodarone
- allopurinol
- imidazoles: ketoconazole, fluconazole
- SSRIs: fluoxetine, sertraline
- ritonavir
- sodium valproate
- acute alcohol intake
- quinupristin

A 20-year-old woman comes in requiring contraception and wants to find out more about the combined oral contraceptive pill. She has heard it can cause cancer and wants to find out more about its risks. Which of the following is the correct advice you can tell her?

- ☐ There is no evidence that the combined oral contraceptive pill causes increased risk of cancer
- ☐ The combined oral contraceptive pill increases the risk of breast and cervical cancer but is protective against ovarian and endometrial cancer
- ☐ The combined oral contraceptive pill increases the risk of breast and ovarian cancer
- ☐ The combined oral contraceptive pill decreases the risk of breast cancer but increases the risk of endometrial and ovarian cancer
- ☐ Only after 10 years of use does the combined oral contraceptive pill increase the risk of breast cancer

Submit answer

There is no evidence that the combined oral contraceptive pill causes increased risk of cancer	5%
The combined oral contraceptive pill increases the risk of breast and cervical cancer but is protective against ovarian and endometrial cancer	50%
The combined oral contraceptive pill increases the risk of breast and ovarian cancer	14%
The combined oral contraceptive pill decreases the risk of breast cancer but increases the risk of endometrial and ovarian cancer	19%
Only after 10 years of use does the combined oral contraceptive pill increase the risk of breast cancer	11%

Combined oral contraceptive pill

- increased risk of breast and cervical cancer
- protective against ovarian and endometrial cancer

Important for me Less important

There is a small increase in breast cancer in women taking the combined oral contraceptive pill. Therefore, in women with known breast cancer mutations such as BRCA1, the risk may exceed the benefit, and women with current breast cancer should not take the combined oral contraceptive pill. There is a small increase in cervical cancer risk after 5 years of use of the combined oral contraceptive pill and this increase to a 2-fold risk after 10 years. However cervical cancer is not a contraindication to use.

Discuss

Improve

Next question >

Combined oral contraceptive pill: advantages/disadvantages

Advantages of combined oral contraceptive pill

- highly effective (failure rate < 1 per 100 woman years)
- doesn't interfere with sex
- contraceptive effects reversible upon stopping
- usually makes periods regular, lighter and less painful
- reduced risk of ovarian, endometrial - this effect may last for several decades after cessation
- reduced risk of colorectal cancer
- may protect against pelvic inflammatory disease
- may reduce ovarian cysts, benign breast disease, acne vulgaris

Disadvantages of combined oral contraceptive pill

- people may forget to take it
- offers no protection against sexually transmitted infections
- increased risk of venous thromboembolic disease
- increased risk of breast and cervical cancer
- increased risk of stroke and ischaemic heart disease (especially in smokers)
- temporary side-effects such as headache, nausea, breast tenderness may be seen

Whilst some users report weight gain whilst taking the combined oral contraceptive pill a Cochrane review did not support a causal relationship.

A 20-year-old female is found at home by her mum with empty packets of paracetamol. She is taken to hospital and states she wanted to end her life and took unto 60 paracetamol tablets over a period of 3 hours.

The registrar immediately starts an infusion of N-acetylcysteine (NAC).

Why is NAC commenced as treatment?

- ☐ Acts as a precursor to glutathione to replenish stores to conjugate the active metabolite
- ☐ N-acetyl-B-benzoquinone imine stores are replenished
- ☐ Homocysteine stores decrease
- ☐ Methionine can act as a by product of NAC to conjugate the active metabolite
- ☐ Cysteine stores are increased to inhibit cytochrome P450

Submit answer

Acts as a precursor to glutathione to replenish stores to conjugate the active metabolite	73%
N-acetyl-B-benzoquinone imine stores are replenished	7%
Homocysteine stores decrease	6%
Methionine can act as a by product of NAC to conjugate the active metabolite	8%
Cysteine stores are increased to inhibit cytochrome P450	7%

N-acetylcysteine is a precursor of glutathione

Important for me [Less important](#)

Methionine can be converted to homocysteine to cysteine and subsequently converted to glutathione under enzyme action. When excess paracetamol is ingested it is metabolised to N-acetyl-B-benzoquinone imine which can deplete glutathione. Thus N-acetylcysteine is given as it is a precursor of glutathione to replenish the stores. Thus option 1 is correct.

Option 2 is the toxic metabolite produced when glutathione becomes saturated.

Homocysteine, methionine and cysteine are precursors in glutathione production. Thus option 3 is incorrect as production is increased.

Option 4 is incorrect as it is not a by product.

Option 5 is incorrect as cysteine is not involved in activation or inhibition of cytochrome P450.




 Discuss (1)

 Improve

Paracetamol overdose: metabolic pathways

The liver normally conjugates paracetamol with glucuronic acid/sulphate. During an overdose the conjugation system becomes saturated leading to oxidation by P450 mixed function oxidases*. This produces a toxic metabolite (N-acetyl-B-benzoquinone imine)

Normally glutathione acts as a defence mechanism by conjugating with the toxin forming the non-toxic mercapturic acid. If glutathione stores run-out, the toxin forms covalent bonds with cell proteins, denaturing them and leading to cell death. This occurs not only in hepatocytes but also in the renal tubules

N-acetyl cysteine is used in the management of paracetamol overdose as it is a precursor of glutathione and hence can increase hepatic glutathione production

*this explains why there is a lower threshold for treating patients who take P450 inducing medications e.g. phenytoin or rifampicin

A 86-year-old gentleman on a care of the elderly ward he is awaiting social care and is feeling well. The nurses have asked you to review him as he is becoming increasingly confused. His clinical examination is normal. You order some bloods:

Na ⁺	123 mmol/l
K ⁺	4.5 mmol/l
Urea	3.6 mmol/l
Creatinine	91 µmol/l

In light of the low sodium, serum and urine osmolalities are ordered. They are as follows:

Plasma osmolality	182 mOsmol/kg	285-295 mOsmol/kg
Urine osmolality	995 mOsmol/kg	500 - 800 mOsmol/kg
Urinary sodium concentration	51 mmol/l	

What is the most appropriate initial treatment?

- ☐ Oral sodium tablets
- ☐ Fluid restrict
- ☐ IV saline
- ☐ Increased dietary salt
- ☐ Encourage oral fluids

Oral sodium tablets

5%

Fluid restrict

64%

IV saline

23%

Increased dietary salt

4%

Encourage oral fluids

4%

SIADH is treated with fluid restriction

Important for me Less important

This patient has SIADH, the initial treatment is fluid restriction.

Giving oral or IV salt would not treat his hyponatraemia as it is caused by the dilutionary affect of increased ADH.

Increasing his fluid intake would worsen his hyponatraemia as you would dilute the sodium in his serum even further.

Dr Assem

A 60-year-old gentleman presents to the Emergency Department with drowsiness, confusion, and some nausea and vomiting. His daughter attends with him and tells you that he has been feeling tired and run-down with a persistent cough, and that he has smoked 20 cigarettes per day for 40 years. The patient himself is unable to give a full history due to the confusion but is able to tell you that sometimes he brings up blood when coughing and his urine has been darker than usual, but he did not want to worry his daughter. On examination, he appears euvolaemic but short of breath. After taking some blood you find a low serum sodium, a high urinary sodium, a low plasma osmolality, and a high urinary osmolality. Renal and thyroid function tests are normal. A chest x-ray indicates a lung carcinoma, and so you suspect this presentation may be caused by a syndrome of inappropriate anti-diuretic hormone secretion.

What is the underlying mechanism causing the hyponatraemia?

- ☐ Inhibition of the sodium-chloride cotransporters
- ☐ Insertion of sodium-potassium-chloride cotransporters
- ☐ Insertion of aquaporin-1 channels
- ☐ Insertion of aquaporin-2 channels
- ☐ Inhibition of sodium-glucose symporters



Antidiuretic hormone promotes water reabsorption by the insertion of aquaporin-2 channels

Important for me [Less important](#)

This is a history of a syndrome of inappropriate anti-diuretic hormone (ADH) secretion (SiADH), caused as a paraneoplastic syndrome to small cell lung cancer. SiADH causes inappropriate release of ADH due to the failure of the normal negative feedback loop. As a result, ADH production is not stopped once serum osmolality returns to normal.

ADH promotes water reabsorption via insertion of aquaporin-2 channels into the collecting ducts. In SiADH, this causes a euvolaemic hyponatraemia as the body does not lose as much water but continues to lose sodium, making the urine more concentrated.

So, the underlying mechanism of the hyponatraemia is actually due to a persistently increased number of aquaporin-2 channels causing water reabsorption rather than any effect on any of the sodium transport mechanisms.

Which one of the following foods is the best source of folic acid?

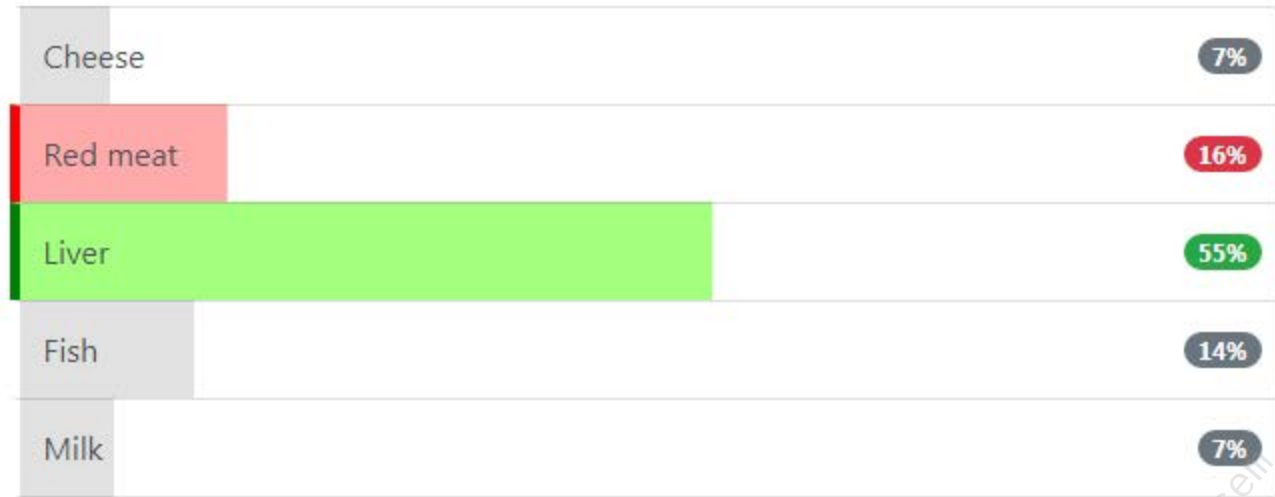
☐ Cheese

☐ Red meat

☐ Liver

☐ Fish

☐ Milk



Folic acid is also present in green vegetables and nuts

A study is designed to assess a new proton pump inhibitor (PPI) in elderly patients who are taking aspirin. The new PPI is given to 120 patients whilst a control group of 240 is given the standard PPI. Over a five year period 24 of the group receiving the new PPI had an upper GI bleed compared to 60 who received the standard PPI. What is the absolute risk reduction?

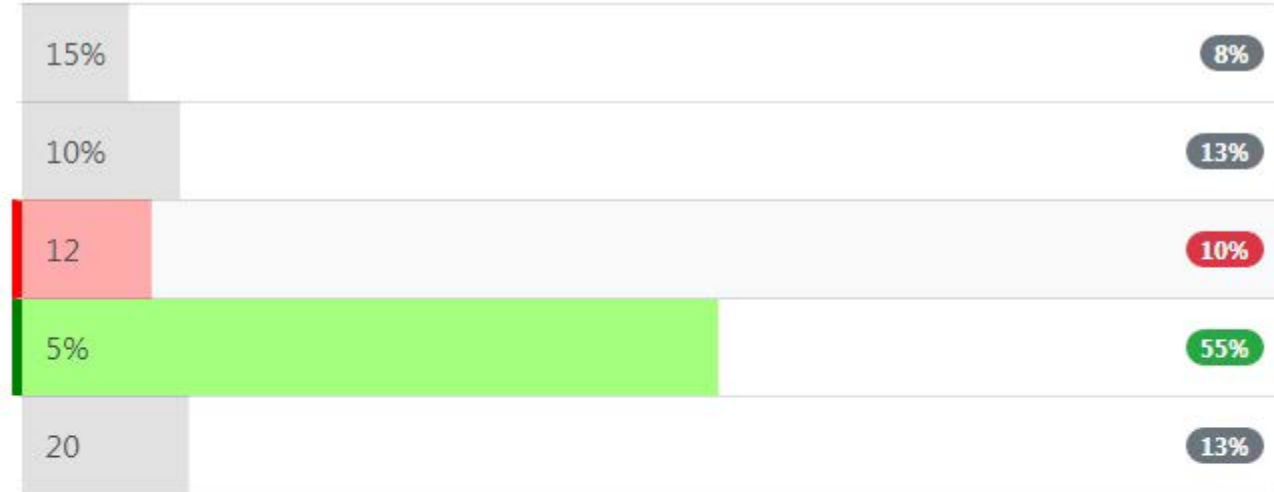
☐ 15%

☐ 10%

☐ 12

☐ 5%

☐ 20



Absolute risk reduction = (Control event rate) - (Experimental event rate)

Control event rate = $60 / 240 = 0.25$

Experimental event rate = $24 / 120 = 0.2$

Absolute risk reduction = $0.25 - 0.2 = 0.05 = 5\%$ reduction

A new drug is being developed by a pharmaceutical company to help treat ovarian cancer. Which phase of clinical trials specifically looks at the efficacy of the drug?

☐ Phase I

☐ Phase IIa

☐ Phase IIb

☐ Phase III

☐ Phase IV

Phase I

11%

Phase IIa

21%

Phase IIb

33%

Phase III

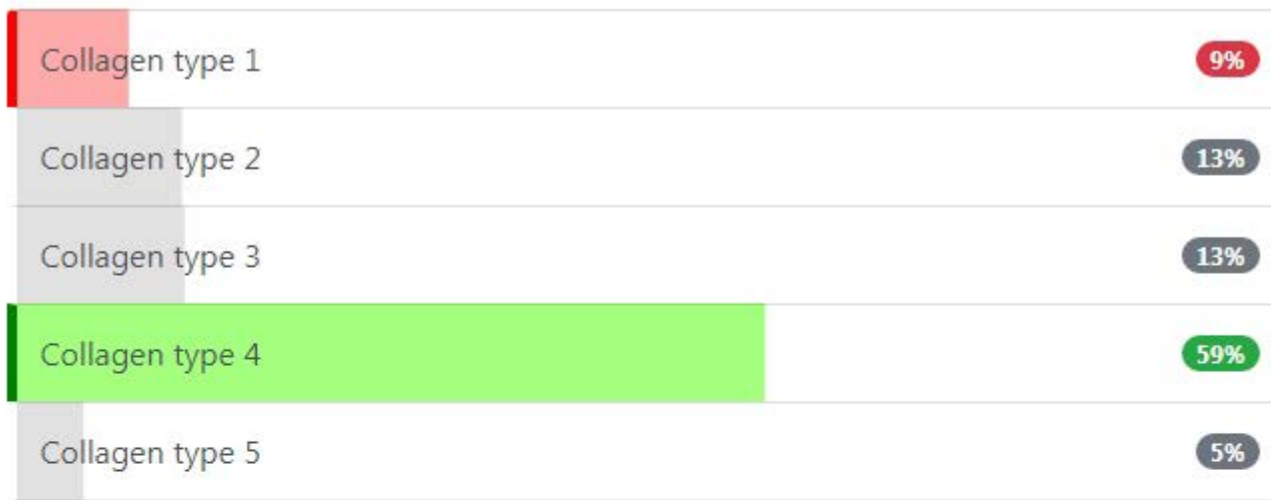
26%

Phase IV

10%

An 18-year-old male is admitted to hospital for haemoptysis. He mentioned that his urine has recently become brown in colour. On examination, his blood pressure is noted to be 170/110. A kidney biopsy is stained positive for autoantibodies confirming a diagnosis of Goodpasture's syndrome. Which type of collagen does this patient produce autoantibodies against?

- ☐ Collagen type 1
- ☐ Collagen type 2
- ☐ Collagen type 3
- ☐ Collagen type 4
- ☐ Collagen type 5



Goodpasture's syndrome is caused by autoantibodies against collagen type IV

Important for me Less important

Collagen IV is defective in Goodpasture's syndrome.

Ehlers-Danlos syndrome is primarily caused by a genetic defect in collagen type III. Collagen Type V is also affected in a less common variant of Ehlers-Danlos syndrome. Collagen type I is defective in osteogenesis imperfecta.

Dr. Assem

A 54-year-old man is brought to the Emergency Department after being found collapsed in the street. He is known to have a history of alcoholic liver disease. Blood tests reveal the following:

Calcium	1.62 mmol/l
Albumin	33 g/l

Which one of the following is the most appropriate management of the calcium result?

- ☐ 10ml of 10% calcium chloride over 10 minutes
- ☐ 20% albumin infusion
- ☐ 10ml of 10% calcium gluconate over 10 minutes
- ☐ No action
- ☐ 10ml of 10% calcium chloride over 4 hours

10ml of 10% calcium chloride over 10 minutes

15%

20% albumin infusion

7%

10ml of 10% calcium gluconate over 10 minutes

57%

No action

10%

10ml of 10% calcium chloride over 4 hours

11%

Intravenous calcium gluconate is used for the acute management of hypocalcaemia

Important for me Less important

Even after correction for the low albumin level this patient has significant hypocalcaemia which should be corrected.

Where is the majority of iron found in the body?

- ☐ Bone
- ☐ Haemoglobin
- ☐ Ferritin and haemosiderin
- ☐ Myoglobin
- ☐ Plasma iron

Bone

5%

Haemoglobin

47%

Ferritin and haemosiderin

30%

Myoglobin

13%

Plasma iron

4%

Which of the following is responsible for the rapid depolarisation phase of the myocardial action potential?

- ☐ Rapid sodium influx
- ☐ Slow sodium efflux
- ☐ Slow efflux of calcium
- ☐ Efflux of potassium
- ☐ Rapid calcium influx

Rapid sodium influx

58%

Slow sodium efflux

7%

Slow efflux of calcium

6%

Efflux of potassium

18%

Rapid calcium influx

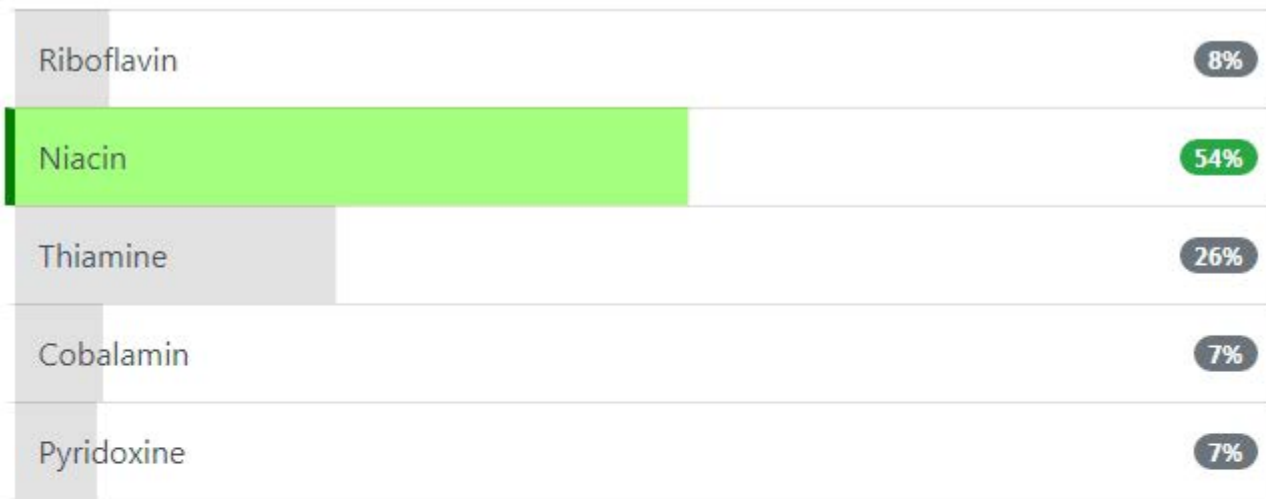
10%

Dr. Arsem

A 63-year-old man presents with a 6-month history of diarrhoea. He is accompanied by his daughter who is concerned about his increasing confusion over the last 3 months. She thinks he might be developing dementia due to his excessive alcohol intake. On examination, you note a dark red rash around his neck with a well-defined border.

Of which vitamin is this man most likely deficient?

- ☐ Riboflavin
- ☐ Niacin
- ☐ Thiamine
- ☐ Cobalamin
- ☐ Pyridoxine



Pellagra is caused by vitamin B3 (niacin) deficiency

Important for me Less important

This man is presenting with the classic 3 D's of pellagra: diarrhoea, dermatitis and dementia. Pellagra is caused by a vitamin B3 (niacin) deficiency.

A 68-year-old man presents with headaches at the sides of his head, worse on chewing and yawning. Which of the following findings would exclude giant cell arteritis?

- ☐ Presence of non-pulsatile temporal artery
- ☐ Normal plasma viscosity
- ☐ No past medical history of polymyalgia rheumatica
- ☐ Normal temporal artery biopsy
- ☐ Normal temperature

Presence of non-pulsatile temporal artery	16%
Normal plasma viscosity	39%
No past medical history of polymyalgia rheumatica	5%
Normal temporal artery biopsy	31%
Normal temperature	8%

A normal temporal artery biopsy in a patient with suspected giant cell arteritis does not exclude the disease because of the potential for skip lesions

Important for me Less important

The correct answer is normal plasma viscosity. Viscosity, ESR and CRP are almost invariably raised in patients with active giant cell arteritis. A normal temporal artery biopsy would make it less likely that he has GCA but is less reassuring than a normal viscosity because GCA can present in the temporal artery with skip lesions.

GCA is more common in patients with polymyalgia rheumatica but can present alone. The temporal artery is likely to be thickened and non-pulsatile in GCA.

NICE CKS: giant cell arteritis

<https://cks.nice.org.uk/giant-cell-arteritis>

Dr Assem

A 50-year-old man is reviewed in the neurology clinic. For the past four months he has been experiencing problems with his right shoulder. On examination he has weakness of shoulder abduction and to a lesser extent weak elbow flexion. A small patch of numbness is noted over the deltoid muscle but otherwise sensation is normal. Where is the neurological lesion?

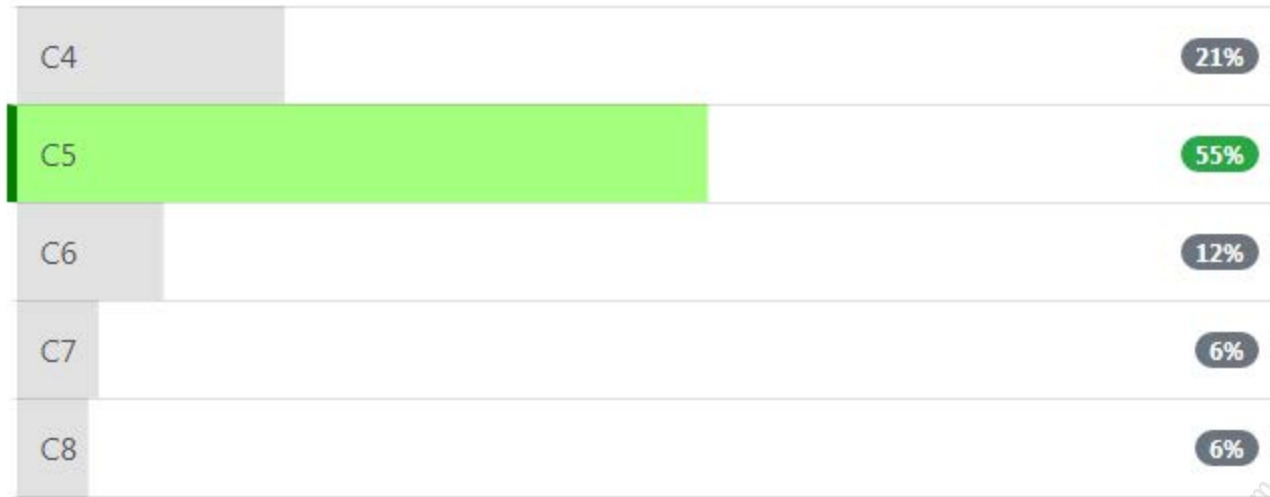
☐ C4

☐ C5

☐ C6

☐ C7

☐ C8



This man has weakness of both the deltoid (C5, C6) and the biceps muscle (C5, C6, C7).
The location of the sensory loss points to a C5 lesion however

A randomised controlled trial is performed to look at a new drug to prevent hip fractures in postmenopausal women. Group A consists of 1,000 women who take the new drug whilst group B contains 1,400 women taking a placebo. The hip fracture rate in group A is 2% and in group B is 4%. What is the number needed to treat to prevent one hip fracture?

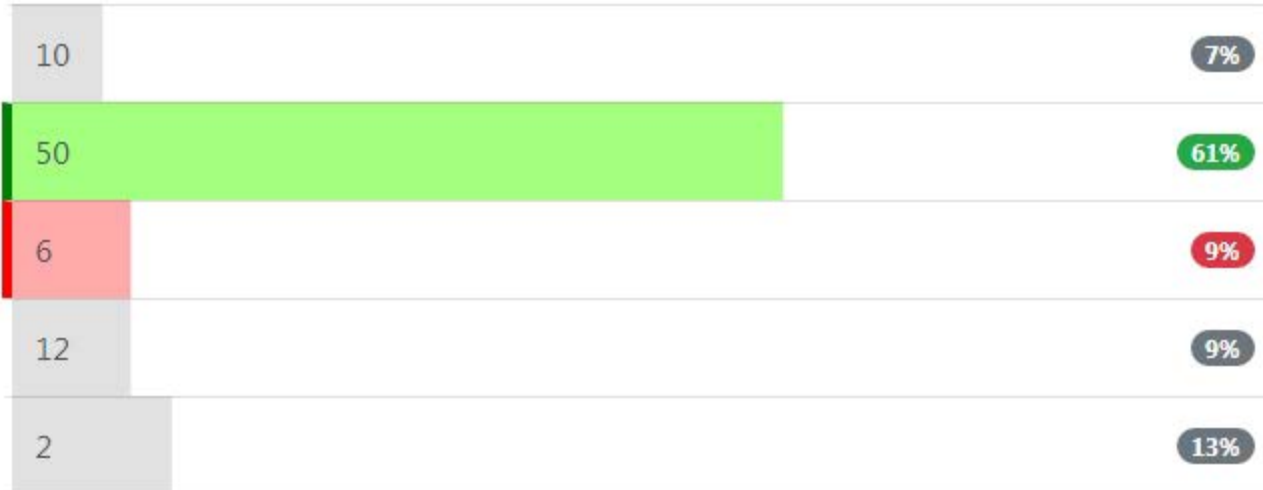
☐ 10

☐ 50

☐ 6

☐ 12

☐ 2



$NNT = 1 / \text{Absolute Risk Reduction}$

Important for me Less important

They key to answering this question is to ignore irrelevant data such as the number of patients in each group.

Control event rate = 4% = 0.04

Experimental event rate = 2% = 0.02

Absolute risk reduction = 0.04 - 0.02 = 0.02

Number needed to treat = $1 / 0.02 = 50$

A 49-year-old male patient is referred by his GP to the dermatology clinic with a lesion on the middle finger of the left hand. He reports that he first noticed the lesion 3 years ago. Initially it was very small but has been slowly growing over the past 3 years. He denies pain over the lesion or any other lesion present. He was started on steroid creams by the GP but did not have any effect on the lesion. On examination, there is a hardened erythematous plaque on the dorsum of the middle finger of the left hand. He reports that he is working in an office but had worked in an aquarium before. There's no recent foreign travel history of note. A biopsy is taken and an organism is grown.

What is the most likely organism to have been grown from the lesion?

- ☐ *Mycobacterium marinum*
- ☐ *Staphylococcus aureus*
- ☐ *Mycobacterium lepromatosis*
- ☐ *Borrelia burgdorferi*
- ☐ *Streptococcus pyogenes*

Mycobacterium marinum

61%

Staphylococcus aureus

5%

Mycobacterium lepromatosis

19%

Borrelia burgdorferi

11%

Streptococcus pyogenes

4%

Fish tank granuloma is caused by *Mycobacterium marinum*

Important for me Less important

The lesion is likely fish tank granuloma, especially given the history of aquarium work. Fish tank granuloma is caused by *Mycobacterium marinum*.

Staphylococcus aureus does not usually cause such lesions.

Mycobacterium lepromatosis is unlikely given the single lesion and lack of travel history.

Borrelia burgdorferi is the causative organism for Lyme disease.

Streptococcus pyogenes is the causative organism for rheumatic fever.

A 45-year-old lady was discharged from hospital following treatment with pamidronate for hypercalcaemia. She now presents with symptoms consistent of hypocalcaemia including muscle spasms and tetany. Which ECG changes are most likely to be present?

- ☐ T wave inversion
- ☐ Peaked T waves
- ☐ Corrected QT interval prolongation
- ☐ U waves
- ☐ Corrected QT interval shortening

T wave inversion	6%
Peaked T waves	4%
Corrected QT interval prolongation	68%
U waves	11%
Corrected QT interval shortening	11%

The clinical picture presented is not atypical when a patient who initially has hypercalcaemia is treated with bisphosphonates and rapidly develops hypocalcaemia.

The following ECG changes are associated with hypocalcaemia:

- Common: Corrected QT interval prolongation
- Rare: Atrial fibrillation or torsade de pointes

(Note: In hypercalcaemia shortening of the QT interval may be observed, in severe cases Osborn (or J-waves) may be present)/

Source: <http://journal.publications.chestnet.org/article.aspx?articleid=1079481>)

A 57-year-old lady is referred by her GP to the rheumatology clinic complaining of arthralgia. On further questioning, she reports dry, gritty eyes and a dry mouth. Blood tests show that she is rheumatoid factor positive and anti-Ro positive.

Which HLA is most associated with the likely diagnosis?

☐ HLA-B27

☐ HLA-DR2

☐ HLA-DR3

☐ HLA-DQ2

☐ HLA-B5

HLA-B27

20%

HLA-DR2

18%

HLA-DR3

38%

HLA-DQ2

13%

HLA-B5

12%

Sjogren's syndrome is associated with HLA-DR3

Important for me Less important

Sjogren's syndrome is associated with HLA-DR3. Therefore 3 is the correct answer.

A contingency table is constructed for a new blood protein marker to screen for prostate cancer in men aged between 50 and 70 years:

	Prostate cancer present	Prostate cancer absent
New test positive	19	20
New test negative	14	723

What is the positive predictive value of the new test?

- ☐ 19/20
- ☐ 723/743
- ☐ 19/39
- ☐ 19/33
- ☐ 723/737

19/20

8%

723/743

6%

19/39

62%

19/33

19%

723/737

5%

Positive predictive value = $TP / (TP + FP)$

Important for me Less important

Positive predictive value = true positives / (true positives + false positives)

= $19 / (19 + 20)$

Dr Assem

A 73-year-old lady was re-admitted after failing to recover from an episode of community-acquired pneumonia. She was discharged 5 days ago on oral antibiotics however is still reporting on-going fevers, headache and a productive cough with brownish phlegm. She began responding to a course of intravenous antibiotics and reported that she had felt a lump in the breast for the past month coinciding with her persisting headaches not responding to analgesics. She was reviewed by the general surgical registrar on-call. A subsequent ultrasound scan of the breast showed the presence of a suspicious lump indicating a possible cancerous lesion.

Given the history and clinical findings, what is the best investigation for her headaches provided there are no contraindications?

- ☐ Magnetic resonance angiography
- ☐ Magnetic resonance imaging with contrast enhancement
- ☐ Magnetic resonance imaging without contrast enhancement
- ☐ Computerised tomography scan with contrast enhancement
- ☐ Magnetic resonance venography

Magnetic resonance angiography	8%
Magnetic resonance imaging with contrast enhancement	36%
Magnetic resonance imaging without contrast enhancement	11%
Computerised tomography scan with contrast enhancement	36%
Magnetic resonance venography	8%

Contrast MRI scan is the gold standard investigation for cerebral metastases - provided no contraindications

Important for me Less important

MRI contrast is the investigation of choice as it's the most sensitive. Single or even multiple well-demarcated lesions are seen with adjacent oedematous changes. Non-enhancing lesions following the introduction of contrast enhancement are far less likely to be metastatic in origin. Contrast-enhanced MRI also has the advantage of detecting leptomeningeal involvement. Bigger metastatic foci appear as ring-enhanced lesions with a central non-enhancing area due to underlying necrotic tissue.

Whilst a CT scan with contrast enhancement increases diagnostic accuracy, it is not as sensitive as an MRI scan with contrast.

Magnetic resonance angiography (MRA) is used to visualise blood vessels and would not be of much benefit in this situation.

Magnetic resonance venography is used to determine the absence of blood flow within the sinuses, which would occur in the presence of venous sinus thrombosis.

Which one of the following reduces the secretion of renin?

☐ Erect posture

☐ Adrenaline

☐ Hyponatraemia

☐ Hypotension

☐ Beta-blockers

Erect posture

14%

Adrenaline

20%

Hyponatraemia

14%

Hypotension

11%

Beta-blockers

40%

Dr. S. S. S. S.

A 22-year-old female student presents to the medical team with a 7-day history of frontal headache, fever, abdominal pain and severe myalgia. She thought it was flu so just stayed at home without seeking medical help. 24 hours ago, she noticed a rash starting in both her arms and now becoming more generalised. On further questioning, she admitted to having just returned from an extended excursion in Central America and had tick bites. On examination, there is a generalised petechial rash covering the arms and small areas of the trunk. Rocky Mountain spotted fever was suspected.

What is the organism implicated in this case?

☐ *Coxiella burnetti*

☐ *Rickettsia typhi*

☐ *Rickettsia prowazekii*

☐ *Ehrlichia*

☐ *Rickettsia rickettsii*

Coxiella burnetti

13%

Rickettsia typhi

11%

Rickettsia prowazekii

15%

Ehrlichia

5%

Rickettsia rickettsii

57%

Rickettsia rickettsii is the causative organism for rocky mountain spotted fever

Important for me Less important

Rickettsia rickettsii is the causative organism for rocky mountain spotted fever.

Coxiella burnetti is the organism causing Q fever.

Rickettsia typhi is the organism causing endemic typhus.

Rickettsia prowazekii is the organism causing epidemic typhus.

Ehrlichia is the organism causing ehrlichiosis.

Dr Assem

A small study looks at the weight of patients diagnosed with type 2 diabetes mellitus. Overall 64 patients were reviewed. The average weight was 81 kg, with a standard deviation of 12 kg. What is the standard error of the mean?

☐ Square root (64 / 12)

☐ Square root (81 / 12)

☐ 12 / 9

☐ 9 / 12

☐ 1.5

Square root (64 / 12)

17%

Square root (81 / 12)

27%

12 / 9

18%

9 / 12

8%

1.5

29%

Standard error of the mean = standard deviation / square root (number of patients)

Important for me Less important

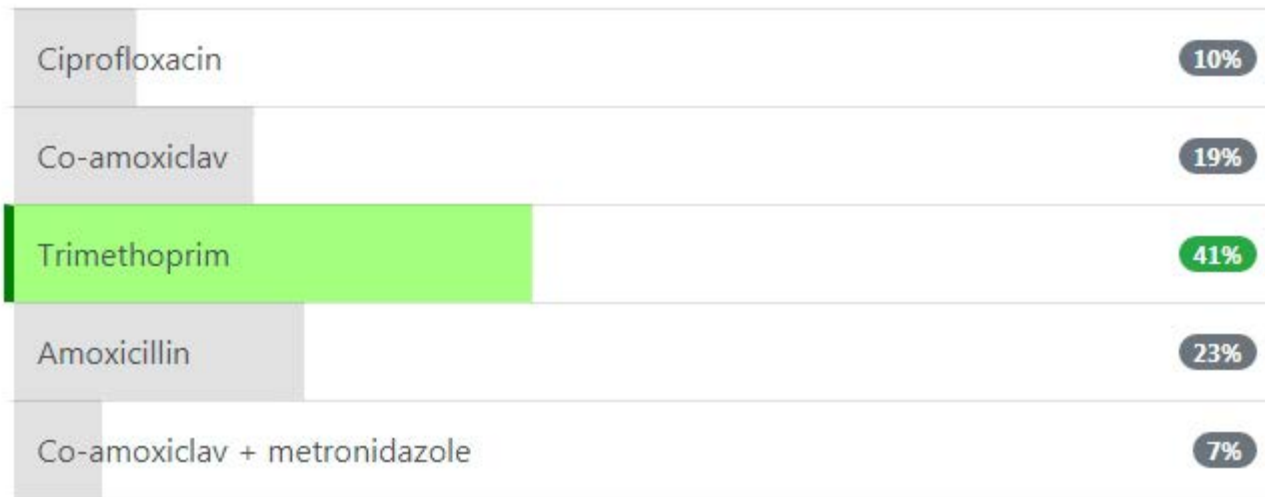
The standard error of the mean is calculated by the standard deviation / square root (number of patients)

= 12 / square root (64) = 12 / 8 = 1.5

Dr Assem

A 29-year-old woman presents with dysuria and frequency four weeks after giving birth. The antenatal period and delivery were unremarkable. She is exclusively breastfeeding her child at the current time. Abdominal examination is unremarkable and she is afebrile. A urine dipstick shows blood +, protein +, leucocytes +++ and nitrites positive. What is the most appropriate management?

- ☐ Ciprofloxacin
- ☐ Co-amoxiclav
- ☐ Trimethoprim
- ☐ Amoxicillin
- ☐ Co-amoxiclav + metronidazole



Trimethoprim in breastfeeding is considered safe to use

Important for me

Less important

Trimethoprim is considered safe to use in breastfeeding women.

An 88-year-old woman with metastatic breast cancer presented with a 4-week history of fatigue, nausea and loss of appetite. More recently, she reported itchy skin and some yellowing of her eyes during the past week. On examination, she had jaundiced sclera with some tenderness of the right upper quadrant on deeper palpation. Her blood tests showed a persistent rise of her liver enzymes particular alanine transaminase (ALT) and alkaline phosphatase (ALP) over the last month.

Given the clinical details, what investigation is most sensitive in detecting the underlying cause?

☐ T1-weighted MRI scan

☐ Liver ultrasound

☐ Liver biopsy

☐ Contrast-enhanced CT

☐ Non-contrast CT

T1-weighted MRI scan

14%

Liver ultrasound

20%

Liver biopsy

13%

Contrast-enhanced CT

40%

Non-contrast CT

12%

Contrast-enhanced CT is very sensitive in detecting hepatic metastases

Important for me Less important

This patient is suffering from symptomatic hepatic metastases secondary to underlying breast carcinoma. The most sensitive investigation to detect this would be a contrast-enhanced CT scan.

Ultrasound is a good initial scan and is very sensitive although the pattern of metastases can be quite variable and not specific to the primary site. The lesions can appear either as hypoechoic or hyperechoic. In colorectal cancer, larger/moderately sized lesions can be visualised.

Contrast-enhanced CT is very sensitive in detecting hepatic metastases (80–90%). Such lesions appear would appear as areas of reduced attenuation with associated ring enhancement. Calcification may be detected with an area of central necrosis.

MRI is more used for difficult problem-solving cases. When using an MRI the metastases appear with reduced attenuation on T1-weighted and with increased signalling on T2-weighted images.

Dr Assem

A 24-year-old man presents with a three day history of painful ulcers on the shaft of his penis and dysuria. He has had no similar previous episodes. A clinical diagnosis of primary genital herpes is made. What is the most appropriate management?

- ☐ Topical famciclovir
- ☐ No treatment is indicated
- ☐ Topical podophyllotoxin
- ☐ Topical valaciclovir
- ☐ Oral aciclovir

A 24-year-old man presents with a three day history of painful ulcers on the shaft of his penis and dysuria. He has had no similar previous episodes. A clinical diagnosis of primary genital herpes is made. What is the most appropriate management?



Oral antiviral therapy is indicated for primary genital herpes infections, even if the presentation is delayed for up to 5 days

Which one of the following best describes the characteristics of a negatively skewed distribution?

☐ Median < mode < mean

☐ Mean < median < mode

☐ Mode < mean < median

☐ Median < mean < mode

☐ Mean < mode < median

Median < mode < mean

10%

Mean < median < mode

47%

Mode < mean < median

18%

Median < mean < mode

12%

Mean < mode < median

13%

Skewed distributions

- alphabetical order: mean - median - mode
- '>' for positive, '<' for negative

Important for me

Less important

Which one of the following is the most important stimulator of the central chemoreceptors?

- ☐ Decrease in pO_2
- ☐ Decrease in pH
- ☐ Decrease in pCO_2
- ☐ Increase in nitric oxide
- ☐ Increase in K^+

Decrease in pO₂

19%

Decrease in pH

47%

Decrease in pCO₂

24%

Increase in nitric oxide

6%

Increase in K⁺

4%

Which one of the following statements regarding growth hormone is **incorrect**?

- ☐ Doesn't act directly on chondrocytes or osteoblasts
- ☐ Is an anabolic hormone
- ☐ Is responsible for changes in protein, lipid, and carbohydrate metabolism
- ☐ Is secreted by the somatotroph cells
- ☐ Acts on a transmembrane receptor

Doesn't act directly on chondrocytes or osteoblasts

40%

Is an anabolic hormone

10%

Is responsible for changes in protein, lipid, and carbohydrate metabolism

9%

Is secreted by the somatotroph cells

17%

Acts on a transmembrane receptor

25%

Growth hormone acts both directly on tissues (e.g. stimulates division and multiplication of cartilage chondrocytes) and also indirectly following the secretion of insulin-like growth factor 1

Dr. Assam

The parents of a 3-year-old boy with cystic fibrosis ask for advice. They are considering having more children. Neither of the parents have cystic fibrosis. What is the chance that their next child will be a carrier of the cystic fibrosis gene?

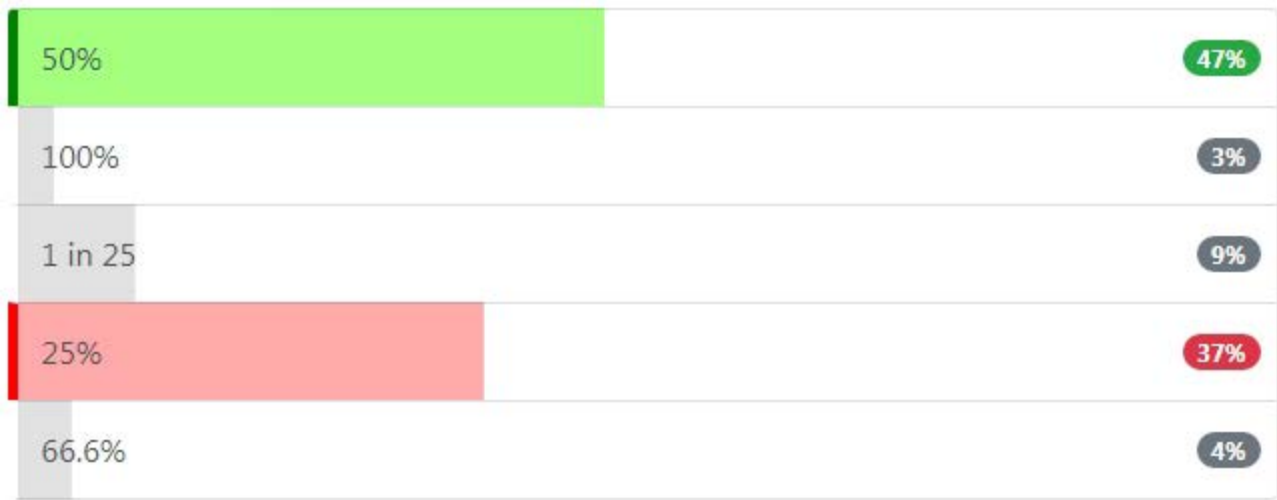
☐ 50%

☐ 100%

☐ 1 in 25

☐ 25%

☐ 66.6%



As cystic fibrosis is an autosomal recessive condition there is a 50% chance that their next child will be a **carrier** of cystic fibrosis (i.e. be heterozygous for the genetic defect) and a 25% chance that the child will actually have the disease (be homozygous).

Haematuria is suspected by the presence of red or brown urine. It may be visible macroscopically (gross haematuria) or detectable in the urine sediment by microscopy. It is often a symptom of an underlying disease, most of them treatable, so that is extremely important to do a clinical approach in order to identify its cause. Which of the following data enhances the possibility that haematuria is of glomerular origin?

- ☐ Initial haematuria
- ☐ Dysmorphic red blood cells found on urine microscopy
- ☐ Haematuria plus pyuria
- ☐ Mono-symptomatic haematuria
- ☐ Fresh blood in urine with presence of clots

Initial haematuria

7%

Dysmorphic red blood cells found on urine microscopy

76%

Haematuria plus pyuria

5%

Mono-symptomatic haematuria

6%

Fresh blood in urine with presence of clots

5%

Dysmorphic red blood cells if found in urine sediment indicates a glomerular origin of hematuria

Important for me [Less important](#)

Abnormalities in the shape of red cells in the urine (dysmorphism) indicates a glomerular origin of hematuria.

Initial haematuria and presence of fresh blood usually indicates lower urinary bleeding, such as urethral bleeding.

Pyuria indicates infection or inflammatory disease but not necessary of a glomerular origin.

If a mono-symptomatic haematuria is noted in a middle age patient, in the absence of infection, a bladder tumour should be ruled out.

Which one of the following hormones is most responsible for the secretion of bicarbonate in the upper gastrointestinal tract?

- ☐ Somatostatin
- ☐ Gastrin
- ☐ Secretin
- ☐ CCK
- ☐ Vasoactive intestinal peptide

Somatostatin

13%

Gastrin

8%

Secretin

48%

CCK

18%

Vasoactive intestinal peptide

13%

Secretin increases secretion of bicarbonate-rich fluid from pancreas and hepatic duct cells

Important for me Less Important

Where is somatostatin secreted from?

- ☐ D cells in the pancreas
- ☐ I cells in upper small intestine
- ☐ K cells in upper small intestine
- ☐ S cells in upper small intestine
- ☐ G cells in stomach

D cells in the pancreas

58%

I cells in upper small intestine

9%

K cells in upper small intestine

5%

S cells in upper small intestine

22%

G cells in stomach

6%

Somatostatin is produced by D cells in the pancreas & stomach

Important for me

Less important

D cells are also found in the stomach and intestine

Dr Assem

Which one of the following statements regarding leukotrienes is not true?

- ☐ Secreted by leukocytes
- ☐ Formed from arachidonic acid
- ☐ Attract leukocytes
- ☐ Cause bronchodilation
- ☐ Increase vascular permeability

Secreted by leukocytes

19%

Formed from arachidonic acid

9%

Attract leukocytes

14%

Cause bronchodilation

49%

Increase vascular permeability

8%

You are a ST1 doctor in medicine doing a nightshift. An elderly patient with colorectal cancer has been admitted to the Emergency Department with suspected bowel obstruction. The Emergency Department F2 doctor has tried to refer the patient to the surgeons but was told that as no surgical intervention is likely the patient should be admitted to the medics. The F2 doctor therefore phones yourself and asks you to accept the patient. What is the most appropriate response?

- ☐ Accept the patient and ask the staff to transfer her to the medical assessment unit
- ☐ Simply refuse in order to avoid the patient being admitted under an inappropriate specialty
- ☐ Tell the surgical registrar that you will contact the on-call surgical consultant if he refuses to accept the patient
- ☐ Go down to the emergency department and review the patient
- ☐ Phone the surgical team yourself to discuss the matter

Accept the patient and ask the staff to transfer her to the medical assessment unit 6%

Simply refuse in order to avoid the patient being admitted under an inappropriate specialty 4%

Tell the surgical registrar that you will contact the on-call surgical consultant if he refuses to accept the patient 6%

Go down to the emergency department and review the patient 66%

Phone the surgical team yourself to discuss the matter 18%

Scenarios similar to this occur on an almost daily basis for admitting medical teams. The priority in all of this has to be the patient. It may be the case if the patient is end-stage then medical admission is more appropriate. If they are Duke's A and awaiting an operation then clearly they are surgical. Until you review the patient yourself you will not have all the facts and this is therefore the best option.

Discussing the matter with the surgical team will help to clarify their opinion about the patient and is the next best option. Accepting the patient without review risks placing a patient with an acute surgical problem on a medical ward. This may delay or compromise care.

Getting into an argument with the surgical registrar is not constructive and is a poor choice, as is simply refusing to see the patient as this indicates a disregard for the patient.

A female with severe renal failure undergoes a kidney transplant. After a few hours, the patient develops a fever and stops passing urine. It is suspected she has hyperacute organ rejection. Which cells are primarily responsible for this?

☐ Helper T Cells

☐ Neutrophils

☐ Eosinophils

☐ Macrophages

☐ B Cells

Helper T Cells

31%

Neutrophils

12%

Eosinophils

6%

Macrophages

20%

B Cells

31%

B cells mediate hyperacute organ rejection

Important for me Less important

B Cells mediate hyperacute organ rejection. Helper T cells mediate both acute and chronic rejection. Macrophages and neutrophils may be seen due to local inflammation but are not chiefly responsible for mediating hyperacute organ rejection. Eosinophils do not play a role in transplant rejection

Which one of the following is a recognised cause of hypokalaemia associated with hypertension

- ☐ Liddle's syndrome
- ☐ Bartter's syndrome
- ☐ Gitelman syndrome
- ☐ Ciclosporin
- ☐ Renal tubular acidosis

Liddle's syndrome	59%
Bartter's syndrome	15%
Gitelman syndrome	11%
Ciclosporin	4%
Renal tubular acidosis	11%

Liddle's syndrome: hypokalaemia + hypertension

Important for me Less important

Liddle's syndrome is an autosomal dominant disorder that mimics hyperaldosteronism, resulting in hypokalaemia associated with hypertension.

Bartter's syndrome is an inherited cause (usually autosomal recessive) of severe hypokalaemia due to defective chloride absorption at the $\text{Na}^+ \text{K}^+ 2\text{Cl}^-$ cotransporter in the ascending loop of Henle. It should be noted that it is associated with normotension.

Gitelman's syndrome is due to a defect in the thiazide-sensitive $\text{Na}^+ \text{Cl}^-$ transporter in the distal convoluted tubule. It is associated with hypokalaemia and normotension.

Dr. Assem

A man with glucose-6-phosphate dehydrogenase deficiency asks for advice regarding his son. What is the chance his son will also develop the disease?

- ☐ 2 in 3
- ☐ No increased risk
- ☐ Will definitely be affected
- ☐ 1 in 2
- ☐ 1 in 4

2 in 3

4%

No increased risk

49%

Will definitely be affected

8%

1 in 2

16%

1 in 4

23%

X-linked recessive conditions - no male-to-male transmission

Important for me

Less important

A 72-year-old woman who is diagnosed with osteoporosis after suffering a Colles' fracture is prescribed vitamin D supplementation. Which one of the following benefits will vitamin D result in?

- ☐ Increased calcium absorption in the gut
- ☐ Promoting renal phosphate excretion
- ☐ Decreased osteoclastic activity
- ☐ Inhibition of the proliferation and differentiation of osteoblasts
- ☐ Decreases osteocalcin release

Increased calcium absorption in the gut

75%

Promoting renal phosphate excretion

6%

Decreased osteoclastic activity

10%

Inhibition of the proliferation and differentiation of osteoblasts

5%

Decreases osteocalcin release

4%

The effects of vitamin D on osteoblasts are complex and not fully understood. Inhibition of osteoblastic activity would not however be in keeping with a beneficial effect on osteoporosis.

Which one of the following conditions may cause hypokalaemia in association with hypertension?

- ☐ Gitelman syndrome
- ☐ 21-hydroxylase deficiency
- ☐ Bartter's syndrome
- ☐ Pheochromocytoma
- ☐ 11-beta hydroxylase deficiency

Gitelman syndrome

14%

21-hydroxylase deficiency

14%

Bartter's syndrome

18%

Phaeochromocytoma

15%

11-beta hydroxylase deficiency

39%

11-beta hydroxylase deficiency associated with hypertension

Important for me Less important

21-hydroxylase deficiency, which accounts for 90% of congenital adrenal hyperplasia cases, is not associated with hypertension

Which one of the following types of blood vessel is first to vasoconstrict in the presence of hypoxia?

- ☐ Muscle arteries
- ☐ Skin arteries
- ☐ Hepatic arteries
- ☐ Renal arteries
- ☐ Pulmonary arteries

Muscle arteries

9%

Skin arteries

35%

Hepatic arteries

5%

Renal arteries

12%

Pulmonary arteries

39%

Pulmonary arteries vasoconstrict in the presence of hypoxia

Important for me

Less important

Patients with deficiencies of which one of the following complement proteins are predisposed to Leiner disease?

☒ C1

☐ C2

☐ C3

☐ C4

☐ C5



Category	Percentage
C1	10%
C2	10%
C3	20%
C4	14%
C5	45%

C1

10%

C2

10%

C3

20%

C4

14%

C5

45%

A 52-year-old man presents to the emergency department with a 5-day history of abdominal pain. He reports a history of recurrent abdominal pain in the right upper abdomen but they have always been self-resolving. On examination, he is jaundiced. Tenderness is elicited on palpating the right upper quadrant. Murphy's sign is negative. His basic observations include temperature 38.7°C, heart rate 100 beats per minute, respiratory rate 24 breaths per minute, blood pressure 110/62 mmHg.

What is the first-line investigation for this patient?

- ☐ Magnetic resonance cholangiopancreatography (MRCP)
- ☐ CT abdomen and pelvis
- ☐ Endoscopic retrograde cholangiopancreatography (ERCP)
- ☐ Ultrasound scan (USS)
- ☐ CT abdomen

Magnetic resonance cholangiopancreatography (MRCP)

13%

CT abdomen and pelvis

7%

Endoscopic retrograde cholangiopancreatography (ERCP)

12%

Ultrasound scan (USS)

57%

CT abdomen

11%

USS is the first line investigation for suspected cholangitis

Important for me [Less important](#)

This patient has the Charcot's triad of right upper quadrant pain, fever and jaundice. USS is the first line investigation for suspected cholangitis.

MRCP is helpful to visualise the biliary tree but not the first line investigation.

ERCP is helpful for the investigation of biliary pathology and therapeutic removal of gallstones but it is not the first line investigation for suspected cholangitis.

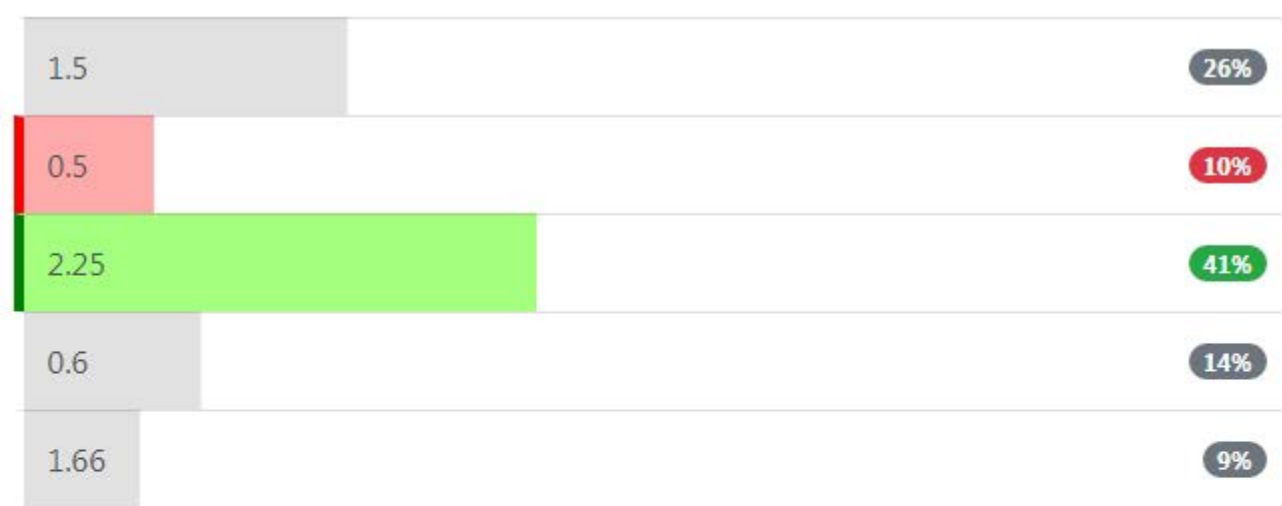
CT abdomen (and pelvis) is helpful to rule out other abdominal pathologies but ultrasound is usually the first line.

A study looks at the use of amoxicillin in the treatment of acute sinusitis compared to placebo. The following results are obtained:

	Total number of patients	Number who achieved resolution of symptoms at 7 days
Amoxicillin	100	60
Placebo	75	30

What is the odds ratio a patient achieving resolution of symptoms at 7 days if they take amoxicillin compared to placebo?

- ☐ 1.5
- ☐ 0.5
- ☐ 2.25
- ☐ 0.6
- ☐ 1.66



The odds of symptoms resolution with amoxicillin = $60 / 40 = 1.5$

The odds of symptoms resolution with placebo = $30 / 45 = (2/3)$

Therefore the odds ratio = $1.5 / (2/3) = 2.25$

Which one of the following statements regarding hypocalcaemia is **incorrect**?

- ☐ Most features are a result of neuromuscular excitability
- ☐ Chronic hypocalcaemia may cause cataracts
- ☐ Perioral paraesthesia is seen
- ☐ Chvostek's sign is more sensitive and specific than Trousseau's sign
- ☐ Prolonged QT interval is seen

Most features are a result of neuromuscular excitability

14%

Chronic hypocalcaemia may cause cataracts

29%

Perioral paraesthesia is seen

8%

Chvostek's sign is more sensitive and specific than Trousseau's sign

36%

Prolonged QT interval is seen

13%

Hypocalcaemia: Trousseau's sign is more sensitive and specific than Chvostek's sign

Important for me Less important

A 64-year-old female patient is referred to the upper GI clinic under the two-week rule. Her son first noticed that her skin and eyes are becoming yellow. Her past medical history includes neurofibromatosis type 1. She was recently diagnosed with Type 2 diabetes mellitus however the blood glucose has been very poorly controlled despite maximum therapy of metformin and gliclazide. On examination, she is jaundiced. There is mild discomfort in the epigastric region and the right upper quadrant. An urgent abdominal CT scan shows a mass arising from the head of the pancreas and dilated common bile duct. A subsequent endoscopic retrograde cholangiopancreatography (ERCP) and biopsy confirms a pancreatic somatostatinoma.

Which cells in the pancreas is this tumour originating from?

☐ H cells

☐ S cells

☐ G cells

☐ I cells

☐ D cells



Somatostatin is produced by D cells in the pancreas & stomach

Important for me Less important

The question is essentially asking for the cells that produce somatostatin. Somatostatinoma is a somatostatin-producing tumour arising from the D cells in the pancreas and stomach. Somatostatin is produced by D cells in the pancreas & stomach. The newly-diagnosed diabetes is likely due to the excessive secretion of somatostatin, as somatostatin inhibits the release of insulin and glucagon.

There's no H cells in the gastrointestinal system.

S cells produce secretin.

G cells produce gastrin.

I cells produce CCK.

Which one of the following diseases is most strongly associated with HLA antigen DR4?

☐ Ankylosing spondylitis

☐ Behcet's disease

☐ Reiter's syndrome

☐ Rheumatoid arthritis

☐ Coeliac disease

Ankylosing spondylitis

8%

Behcet's disease

6%

Reiter's syndrome

5%

Rheumatoid arthritis

69%

Coeliac disease

11%

Rheumatoid arthritis - HLA DR4

Important for me Less important

Around 70% of patients with rheumatoid arthritis are HLA-DR4. Patients with Felty's syndrome (a triad of rheumatoid arthritis, splenomegaly and neutropaenia) are even more strongly associated with 90% being HLA-DR4

Dr Assem

A 43-year-old man has a routine medical for insurance purposes. The following result is obtained:

Uric acid	622 $\mu\text{mol/l}$ (210 - 480)
-----------	-----------------------------------

He is well with no significant past medical history. What is the most appropriate test to perform next?

- ☐ Lipid profile
- ☐ Thyroid function test
- ☐ Calcium
- ☐ Parathyroid hormone
- ☐ Pyrophosphate levels

Lipid profile	37%
Thyroid function test	14%
Calcium	13%
Parathyroid hormone	10%
Pyrophosphate levels	26%

Hyperuricaemia may be associated with both hyperlipidaemia and hypertension. It may also be seen in conjunction with the metabolic syndrome

Each one of the following causes of hyponatraemia is associated with a urinary sodium of less than 20 mmol/L, except:

- ☐ Diarrhoea
- ☐ Psychogenic polydipsia
- ☐ Burns
- ☐ Secondary hyperaldosteronism
- ☐ Syndrome of inappropriate ADH

Diarrhoea

11%

Psychogenic polydipsia

12%

Burns

9%

Secondary hyperaldosteronism

12%

Syndrome of inappropriate ADH

56%

Syndrome of inappropriate ADH is associated with urinary sodium > 20 mmol/l

The commonest chromosomal defect in Down's syndrome is:

☐ Trinucleotide repeat disorder

☐ Autosomal dominant

☐ Translocation

☐ Mosaicism

☐ Non-dysjunction

Trinucleotide repeat disorder

12%

Autosomal dominant

5%

Translocation

21%

Mosaicism

16%

Non-dysjunction

46%

A 34-week-old baby was born by emergency caesarean section due to placental abruption. Polyhydramnios was detected antenatal but no cause found. Whilst on the neonatal unit, the baby showed failure to thrive, occasional vomiting. Blood gas showed hypokalaemia, hyponatraemia, hypochloraemia and metabolic alkalosis. Subsequently excessive sodium, potassium and chloride were found in the urine.

What is the most likely diagnosis?

- ☐ Diabetes insipidus
- ☐ Syndrome of inappropriate ADH
- ☐ Addison's disease
- ☐ Bartter's syndrome
- ☐ Diabetes mellitus

Diabetes insipidus	10%
Syndrome of inappropriate ADH	13%
Addison's disease	11%
Bartter's syndrome	62%
Diabetes mellitus	5%

Bartter's syndrome is a cause of metabolic alkalosis

Important for me [Less important](#)

This baby presents with symptoms and signs of Bartter's syndrome. Bartter's syndrome is a cause of metabolic alkalosis along with excessive loss of sodium, potassium and chloride. Polyhydramnios is typical in the neonatal form of Bartter's syndrome.

Diabetes insipidus typically presents with hypernatraemia rather than hyponatraemia as in this case.

Addison's disease typically presents with hyperkalaemia and in some cases metabolic acidosis.

Diabetes mellitus does not typically cause metabolic alkalosis.

A cohort study is being designed to look at the relationship between smoking and breast cancer. What is the usual outcome measure in a cohort study?

- ☐ Odds ratio
- ☐ Experimental event rate
- ☐ Relative risk
- ☐ Absolute risk increase
- ☐ Numbers needed to harm

Odds ratio

24%

Experimental event rate

5%

Relative risk

58%

Absolute risk increase

8%

Numbers needed to harm

4%

Cohort studies - relative risk

Important for me Less important

Which one of the following statements regarding nitric oxide is **incorrect**?

- ☐ Promotes platelet aggregation
- ☐ Raises intracellular cGMP levels
- ☐ An inducible form of NOS is present in macrophages
- ☐ In sepsis increased levels of NO contribute to septic shock
- ☐ Causes venodilation

Promotes platelet aggregation

47%

Raises intracellular cGMP levels

14%

An inducible form of NOS is present in macrophages

13%

In sepsis increased levels of NO contribute to septic shock

13%

Causes venodilation

14%

Nitric oxide - vasodilation + inhibits platelet aggregation

Important for me

Less important

Nitric oxide inhibits, rather than promotes, platelet aggregation

Which one of the following types of immunoglobulins are responsible for haemolytic blood transfusion reactions?

☐ IgD

☐ IgE

☐ IgM

☐ IgA

☐ IgG

IgD

7%

IgE

11%

IgM

39%

IgA

11%

IgG

33%

A 17-year-old girl with Turner's syndrome is reviewed in the cardiology clinic. Other than coarctation of the aorta, what is the most common cardiac abnormality found in patients with Turner's syndrome?

- ☐ Ventricular septal defect
- ☐ Bicuspid aortic valve
- ☐ Aortic stenosis
- ☐ Pulmonary stenosis
- ☐ Partial anomalous venous drainage

Ventricular septal defect

11%

Bicuspid aortic valve

73%

Aortic stenosis

7%

Pulmonary stenosis

6%

Partial anomalous venous drainage

3%

Turner's syndrome - most common cardiac defect is bicuspid aortic valve

Important for me

Less important

Up to 15% of adults with Turner's syndrome have bicuspid aortic valves

A 15-year-old boy is reviewed. He has been referred by his GP with ptosis, diplopia and night blindness. On examination he is noted to have a degree of ophthalmoplegia, bilateral partial ptosis and evidence of retinitis pigmentosa during fundoscopy. His mother developed a similar problem when she was 18-years-old. What is the most likely diagnosis?

- ☐ Kearns-Sayre syndrome
- ☐ Alport's syndrome
- ☐ Usher syndrome
- ☐ Refsum disease
- ☐ Lawrence-Moon-Biedl syndrome

Kearns-Sayre syndrome

42%

Alport's syndrome

15%

Usher syndrome

11%

Refsum disease

12%

Lawrence-Moon-Biedl syndrome

18%

Kearns-Sayre syndrome

- mitochondrial inheritance
- onset < 20-years-old
- external ophthalmoplegia
- retinitis pigmentosa

Important for me Less important

A 67-year-old man is discharged after having a percutaneous coronary intervention following an acute coronary syndrome (ACS). He had no past medical of note prior to the ACS. Which type of lipid modification therapy should he have been started on during the admission?

- ☐ Simvastatin 40mg on
- ☐ Atorvastatin 10mg on
- ☐ Atorvastatin 20mg on
- ☐ Atorvastatin 40mg on
- ☐ Atorvastatin 80mg on

Simvastatin 40mg on

6%

Atorvastatin 10mg on

6%

Atorvastatin 20mg on

10%

Atorvastatin 40mg on

16%

Atorvastatin 80mg on

62%

Patients with established CVD should take atorvastatin 80mg on

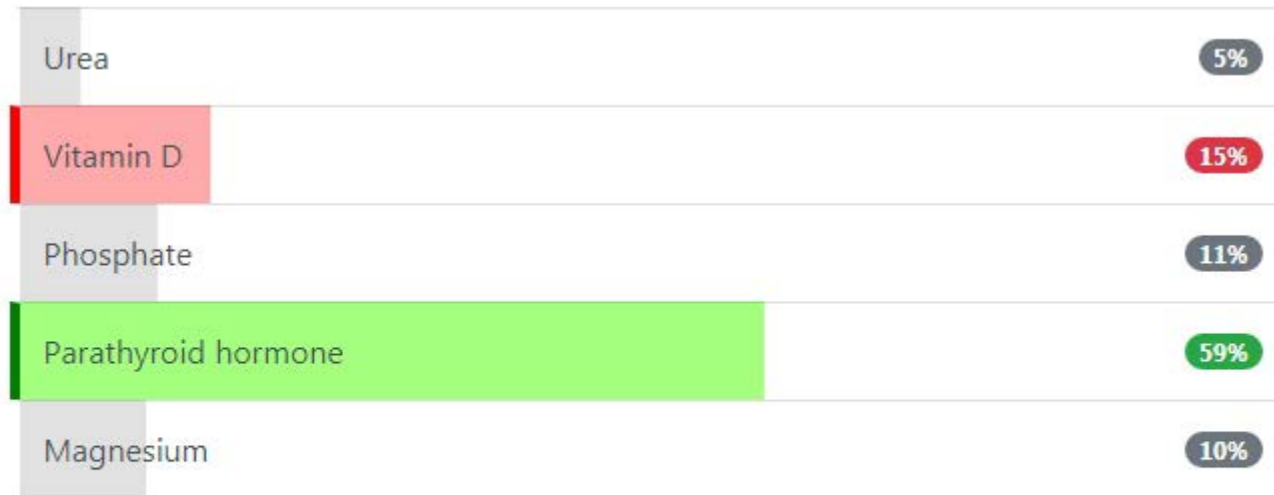
Important for me Less important

A 61-year-old woman is admitted to the Acute Medical Unit as she is generally unwell with muscle twitching. Blood pressure is recorded at 114/78 mmHg, pulse 84/min and she is apyrexial. Blood tests reveal the following:

Calcium	1.94 mmol/l
Albumin	38 g/l

Which one of the following tests is most useful in elucidating the cause of her symptoms?

- ☐ Urea
- ☐ Vitamin D
- ☐ Phosphate
- ☐ Parathyroid hormone
- ☐ Magnesium



Parathyroid hormone is the single most useful test in determining the cause of hypocalcaemia

Which of the following conditions is inherited in a X-linked recessive fashion?

- ☐ Androgen insensitivity syndrome
- ☐ Myotonic dystrophy
- ☐ von Willebrand's disease
- ☐ Ehlers-Danlos syndrome
- ☐ Huntington's disease

Androgen insensitivity syndrome

40%

Myotonic dystrophy

21%

von Willebrand's disease

19%

Ehlers-Danlos syndrome

10%

Huntington's disease

11%

X-linked conditions: Duchenne/Becker, haemophilia, G6PD

Important for me Less important

A case-control study is being designed to look at the relationship between epilepsy and a new vaccine for varicella. What is the usual outcome measure in a case-control study?

☐ Numbers needed to harm

☐ Odds ratio

☐ Experimental event rate

☐ Absolute risk increase

☐ Relative risk

Numbers needed to harm

5%

Odds ratio

50%

Experimental event rate

9%

Absolute risk increase

9%

Relative risk

26%

Case-control studies - odds ratio

Important for me Less important

A 24-year-old man is investigated for visual loss and is diagnosed as having Leber's optic atrophy. Given the mitochondrial inheritance of this condition, which one of the following relatives is most likely to be also affected?

☐ Daughter

☐ Sister

☐ Son

☐ Paternal uncle

☐ Father

Daughter

16%

Sister

53%

Son

11%

Paternal uncle

14%

Father

7%

Mitochondrial diseases follow a maternal inheritance pattern

Important for me Less Important

All the children of an affected mother will inherit a mitochondrial condition. His sister will therefore also be affected.

Which cell organelle is involved in the breakdown of oligopeptides?

- ☐ Golgi apparatus
- ☐ Rough endoplasmic reticulum
- ☐ Peroxisome
- ☐ Lysosome
- ☐ Smooth endoplasmic reticulum

Golgi apparatus

8%

Rough endoplasmic reticulum

7%

Peroxisome

28%

Lysosome

51%

Smooth endoplasmic reticulum

6%

Protein degradation in eukaryotes is also carried out by protein complexes called proteasomes.

Which one of the following is equivalent to the pre-test probability?

- ☐ Post test odds / (1 + post-test odds)
- ☐ Pre-test odds x likelihood ratio
- ☐ The prevalence of a condition
- ☐ The incidence of a condition
- ☐ Post-test odds / likelihood ratio

Post test odds / (1 + post-test odds)	10%
Pre-test odds x likelihood ratio	28%
The prevalence of a condition	36%
The incidence of a condition	13%
Post-test odds / likelihood ratio	13%

The prevalence is the proportion of a population that have the condition at a point in time whilst the incidence is the rate at which new cases occur in a population during a specified time period.

A 24-year-old male is admitted with a head injury. Approximately one hour ago he was hit on the lateral aspect of his head by a high velocity cricket ball. A collateral history reveals that he lost consciousness immediately after the impact. Paramedics on the scene noted his Glasgow coma score of 15. On examination he has Glasgow coma score of 13 (M5, V4, E4) on arrival in the department. He has anterograde and retrograde amnesia to events. You arrange an urgent CT scan.

Which clinical sign would be most concerning in this patient?

- ☐ Pyrexia
- ☐ Hypotension
- ☐ Bradycardia
- ☐ Tachycardia
- ☐ Decreased pulse pressure

Pyrexia	5%
Hypotension	20%
Bradycardia	61%
Tachycardia	8%
Decreased pulse pressure	6%

The Cushing reflex is a physiological nervous system response to increased intracranial pressure (ICP) that results in hypertension and bradycardia

Important for me Less important

The mechanism of injury, loss of consciousness and 'lucid interval' should ring alarm bells for an extradural haematoma. The Cushing reflex is a physiological nervous system response to increased intracranial pressure that results in hypertension and bradycardia. Cerebral perfusion pressure (CPP) = mean arterial pressure (MAP) - intracranial pressure. Therefore if intracranial pressure is high, the only way the body can compensate to increase CPP is by increasing MAP. A sympathetic reflex therefore results in hypertension. This results in a counter parasympathetic reflex by stimulation of the baroreceptors resulting in bradycardia.

Which one of the following karyotypes is associated with short stature?

☐ 45,XO

☐ 46,YO

☐ 46,XO

☐ 47,XYY

☐ 47,XXY

Dr Assem

45,XO

69%

46,YO

3%

46,XO

15%

47,XYY

3%

47,XXY

9%

You are trying to assess the risk of hepatic dysfunction associated with a new drug for the treatment of cardiac failure. In total there have been 5 phase 3 studies and a cardiac outcome study has been published.

Which of the following is the optimal way to assess the risk of hepatic dysfunction?

- ☐ Case control study
- ☐ Cohort study
- ☐ Mechanistic study in patients with hepatic dysfunction
- ☐ Meta-analysis of published randomised controlled trials
- ☐ New prospective randomised controlled trial

Case control study	14%
Cohort study	16%
Mechanistic study in patients with hepatic dysfunction	6%
Meta-analysis of published randomised controlled trials	51%
New prospective randomised controlled trial	12%

in this situation, time is of the essence in evaluating the possible signal of hepatic dysfunction because of risk to patients. By amalgamating data from published randomised controlled trials, one single study which would not have the power to detect a signal for hepatic dysfunction could be combined with others to confirm or refute any risk of incident liver disease. This is, therefore, the preferred option.

A case-control study is unlikely to have the granularity to confirm or refute risk of incident liver disease, and a cohort study would be a massive and lengthy undertaking. A new prospective randomised controlled trial would have to be large and long to confirm a liver signal, and a mechanistic study in patients with hepatic dysfunction may well not be reflective of the population of clinical use.

A 28-year-old female with a history of primary amenorrhoea and short stature is reviewed in clinic. On examination blood pressure in her right arm is 175/84 mmHg and 170/82 mmHg in her left. What is the most likely cause for her elevated blood pressure?

- ☐ Coarctation of the aorta
- ☐ Conn's syndrome
- ☐ Essential hypertension
- ☐ Renal aplasia
- ☐ Renal artery stenosis

Coarctation of the aorta

68%

Conn's syndrome

9%

Essential hypertension

7%

Renal aplasia

6%

Renal artery stenosis

11%

Turner's syndrome is associated with aortic coarctation

Important for me [Less important](#)

This patient has Turner's syndrome which is associated with coarctation of the aorta. The site of the coarctation, for example if it involves the origin of the left subclavian artery, determines whether there is a difference between the right and left arm blood pressure readings. There is no significant difference in this case.

Another cause worth considering in a young hypertensive patient with primary amenorrhoea would be congenital adrenal hyperplasia

Essential hypertension would be unusual in a 28-year-old

A 23-year-old female with Down's syndrome is reviewed in clinic. Which one of the following features is least associated with her condition?

- ☐ Infertility
- ☐ Hypothyroidism
- ☐ Alzheimer's disease
- ☐ Short stature
- ☐ Ventricular septal defect



Condition	Percentage
Infertility	41%
Hypothyroidism	15%
Alzheimer's disease	21%
Short stature	9%
Ventricular septal defect	14%

Infertility

41%

Hypothyroidism

15%

Alzheimer's disease

21%

Short stature

9%

Ventricular septal defect

14%

As this patient is female she is likely to be subfertile rather than infertile - please see the notes below

Dr Assem

A 12-year-old girl develops facial swelling and an erythematous itchy rash shortly after being administered the first dose of the HPV vaccine. On arrival the paramedics note a bilateral expiratory wheeze and blood pressure of 80/50 mmHg. In the Gell and Coombs classification of hypersensitivity reactions this is an example of a:

- ☐ Type I reaction
- ☐ Type II reaction
- ☐ Type III reaction
- ☐ Type IV reaction
- ☐ Type V reaction

Type I reaction

73%

Type II reaction

7%

Type III reaction

6%

Type IV reaction

10%

Type V reaction

4%

Type I hypersensitivity reaction - anaphylaxis

Important for me Less important

In terms of the cell cycle, mitosis takes place in:

☐ M

☐ M0

☐ G1

☐ S

☐ G2

M

53%

M0

13%

G1

14%

S

11%

G2

9%

What is the correct formula to calculate the positive predictive value?

TP = true positive; FP = false positive; TN = true negative; FN = false negative

☐ Sensitivity / (1 - specificity)

☐ $TP / (TP + FP)$

☐ $TN / (TN + FP)$

☐ $TN / (TN + FN)$

☐ $TP / (TP + FN)$

Sensitivity / (1 - specificity)

8%

TP / (TP + FP)

58%

TN / (TN + FP)

8%

TN / (TN + FN)

7%

TP / (TP + FN)

19%

Positive predictive value = $TP / (TP + FP)$

Important for me Less important

A 68-year-old man is admitted with haematemesis. A gastroscopy performed as an inpatient shows a carcinoma which is confirmed on biopsy. Who is the most appropriate person to inform the patient of the diagnosis?

- ☐ The F2 doctor on the ward who has most contact with the patient
- ☐ The doctor who performed the gastroscopy
- ☐ His GP following discharge
- ☐ The consultant in-charge of his care
- ☐ His next-of-kin after you have told him/her

The F2 doctor on the ward who has most contact with the patient	8%
The doctor who performed the gastroscopy	12%
His GP following discharge	5%
The consultant in-charge of his care	70%
His next-of-kin after you have told him/her	5%

One of the key aims of the entrance exam is to assess a doctors ability to act in a compassionate and empathetic way. Many of you may recall incidences of patients being told about a cancer diagnosis in inappropriate circumstances.

The most appropriate person to inform the patient is the consultant in this scenario. He/she is currently in charge of their care and will be best placed to answer questions about management and prognosis. The F2 doctor will be less able to do this but will at least be known to the patient.

The doctor who performed the gastroscopy is unlikely to know the patient apart from their brief meeting prior to the procedure. Asking the GP to tell the patient is a 'cop-out' on a number of levels. Firstly the patient may feel that the hospital team 'could not be bothered' to tell him themselves. Secondly it results in an unnecessary delay and thirdly the GP may not be best placed to give information on management and prognosis.

Telling the next-of-kin is the worst option as it breaks confidentiality.

A 19-year-old female with a history of anorexia nervosa is admitted to hospital. Her BMI has dropped to 16. She has agreed to be fed by nasogastric tube. Which one of the following electrolyte disturbances is most likely to occur?

☐ Hyperkalaemia

☐ Hypocalcaemia

☐ Metabolic acidosis

☐ Hypophosphataemia

☐ Hypermagnesaemia

Hyperkalaemia

6%

Hypocalcaemia

6%

Metabolic acidosis

5%

Hypophosphataemia

76%

Hypermagnesemia

7%

Refeeding syndrome causes hypophosphataemia

Important for me

Less important

This patient is at risk of refeeding syndrome, which can lead to profound hypophosphataemia

Dr Assem

Which layer of the epidermis are melanocytes found in?

- ☐ Stratum lucidum
- ☐ Stratum germinativum
- ☐ Stratum spinosum
- ☐ Stratum corneum
- ☐ Stratum granulosum

Stratum lucidum

7%

Stratum germinativum

46%

Stratum spinosum

13%

Stratum corneum

14%

Stratum granulosum

20%

Epidermis - 5 layers - bottom layer = stratum germinativum which gives rise to keratinocytes and contains melanocytes

Important for me Less important

A 2-day-old baby girl is noted to become cyanotic whilst feeding and crying. A diagnosis of congenital heart disease is suspected. What is the most likely cause?

☐ Transposition of the great arteries

☐ Coarctation of the aorta

☐ Patent ductus arteriosus

☐ Tetralogy of Fallot

☐ Ventricular septal defect

Transposition of the great arteries

43%

Coarctation of the aorta

5%

Patent ductus arteriosus

14%

Tetralogy of Fallot

29%

Ventricular septal defect

9%

Congenital heart disease

- cyanotic: TGA most common at birth, Fallot's most common overall
- acyanotic: VSD most common cause

Important for me Less important

The key point to this question is that whilst tetralogy of Fallot is more common than transposition of the great arteries (TGA), Fallot's doesn't usually present until 1-2 months following the identification of a murmur or cyanosis. In the neonate, TGA is the most common presenting cause of cyanotic congenital heart disease

The other 3 options are causes of acyanotic congenital heart disease

Each one of the following is associated with hyperkalaemia, except:

- ☐ Rhabdomyolysis
- ☐ Carbenoxolone
- ☐ Acute renal failure
- ☐ Ciclosporin
- ☐ Addison's

Rhabdomyolysis

8%

Carbenoxolone

50%

Acute renal failure

7%

Ciclosporin

13%

Addison's

22%

Which of the following conditions is inherited in an autosomal recessive fashion?

- ☐ Hypokalaemic periodic paralysis
- ☐ Adult polycystic disease
- ☐ Huntington's disease
- ☐ Friedreich's ataxia
- ☐ Ehlers-Danlos syndrome

Hypokalaemic periodic paralysis

21%

Adult polycystic disease

7%

Huntington's disease

6%

Friedreich's ataxia

57%

Ehlers-Danlos syndrome

9%

Autosomal recessive conditions are 'metabolic' - exceptions: inherited ataxias

Autosomal dominant conditions are 'structural' - exceptions: Gilbert's, hyperlipidaemia type II

Important for me Less important

Dr Assem

Which one of the following is least associated with homocystinuria?

- ☐ Recurrent renal stones
- ☐ Downwards lens dislocation
- ☐ Deep vein thrombosis
- ☐ Arachnodactyly
- ☐ Learning difficulties

Recurrent renal stones

30%

Downwards lens dislocation

15%

Deep vein thrombosis

24%

Arachnodactyly

22%

Learning difficulties

9%

Cystinuria not homocystinuria is associated with recurrent renal stones

Dr Assem

A new drug which may reduce the chance of patients with chronic kidney disease developing gout is introduced. In one study of 2,000 patients 1,200 received the new drug of which 120 patients develop gout. The remaining 800 patients received a placebo of which 200 developed gout. What is the absolute risk reduction of developing gout?

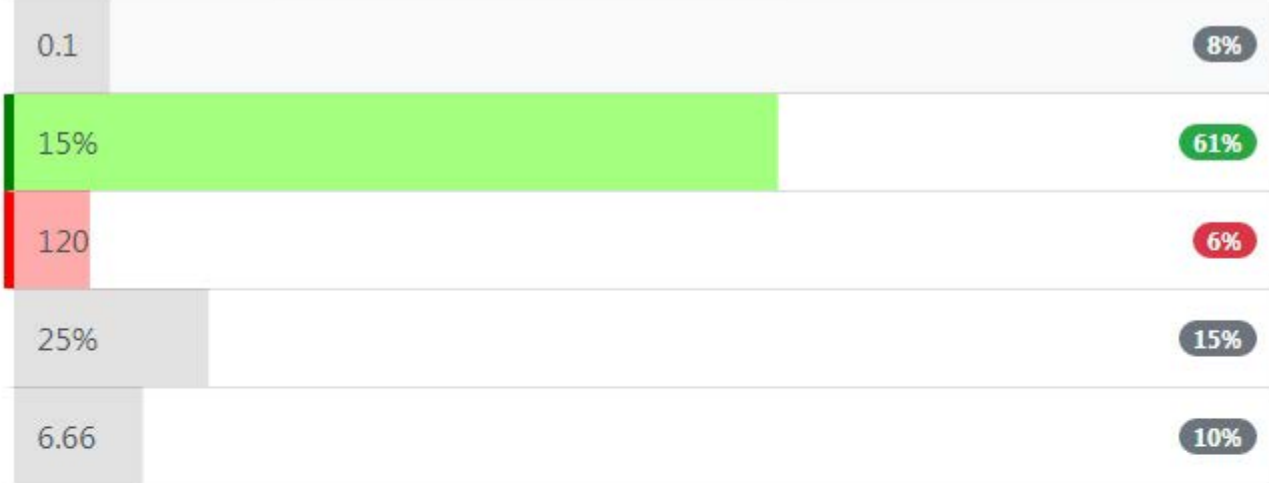
☐ 0.1

☐ 15%

☐ 120

☐ 25%

☐ 6.66



Absolute risk reduction = (Control event rate) - (Experimental event rate)

Important for me Less important

Absolute risk reduction = (Experimental event rate) - (Control event rate)

Control event rate = $200 / 800 = 0.25$

Experimental event rate = $120 / 1,200 = 0.1$

Absolute risk reduction = $0.25 - 0.1 = 0.15 = 15\%$ reduction

A 28-year-old woman presents with a 3-day history of dysuria and increased urinary frequency. She denies any vaginal discharge or menorrhagia. Urine dipstick is positive for leukocytes and nitrites. Urine culture grows a urease-bacteria that is identified as *Proteus mirabilis*. She is treated with antibiotics.

Chronic and recurrent infections with this bacteria predispose patients to which of the following types of renal stones?

- ☐ Calcium oxalate
- ☐ Calcium phosphate
- ☐ Ammonium magnesium phosphate (struvite)
- ☐ Uric acid
- ☐ Cystine

Calcium oxalate	12%
Calcium phosphate	7%
Ammonium magnesium phosphate (struvite)	62%
Uric acid	9%
Cystine	10%

Recurrent urease-positive bacteria (eg. *proteus mirabilis*) infections predispose individuals to struvite renal stones

Important for me Less important

Struvite accounts for 15% of stones. It is caused by infections with urease-positive bacteria (e.g. *Proteus mirabilis*) that hydrolyze urea to ammonia and alkalize the urine. They commonly form staghorn calculi.

Calcium-based renal stones account for 80% of all stones. They are mostly idiopathic but may result from antifreeze ingestion, vitamin C abuse, hypocitraturia and malabsorption (e.g. Crohn disease).

Uric acid renal stones account for about 5% of all stones. Risk factors include reduced urine volume, arid climates, acidic pH. It is strongly associated with hyperuricaemia (e.g. gout) and is often seen in diseases with high cell turnover (e.g. leukaemia)

Cystine renal stones result from a hereditary condition in which cystine-reabsorbing PCT transporter loses function, causing cystinuria. Cystine is poorly soluble, thus stones form in the urine. They can also form staghorn calculi.

A neonate female born at 37 weeks gestation develops severe cyanosis 1 hour after birth. She develops worsening respiratory distress and becomes highly tachypnoeic with difficulty feeding. She is soon transferred to the neonatal intensive care unit for supportive treatment. Her mother did not seek any antenatal care and the baby was born via an uncomplicated spontaneous vaginal delivery.

On physical examination, the neonate is cyanosed and lethargic. Her vital signs were as follows: respiratory rate 62/min, oxygen saturation 84% (on 60% oxygen), heart rate 160/min, blood pressure 96/66 mmHg. Cardiac auscultation reveals a loud S2 heart sound.

Chest x-ray shows the cardiac silhouette with an 'eggs on a string' appearance. Electrocardiogram (ECG) shows a right ventricular dominance. Further diagnostic workup with echocardiography confirms a congenital heart defect.

Which of the following is the most likely underlying embryological pathology in this neonate's congenital heart defect?

- ☐ Absent tricuspid valve and hypoplastic right ventricle
- ☐ Anterosuperior displacement of the infundibular septum
- ☐ Defect in interatrial septum
- ☐ Failure of the aorticopulmonary septum to spiral
- ☐ Aortic narrowing near insertion of ductus arteriosus

Absent tricuspid valve and hypoplastic right ventricle

17%

Anterosuperior displacement of the infundibular septum

14%

Defect in interatrial septum

13%

Failure of the aortopulmonary septum to spiral

44%

Aortic narrowing near insertion of ductus arteriosus

13%

Transposition of great vessels is due to the failure of the aortopulmonary septum to spiral

Important for me [Less important](#)

The clinical stem here is significant for a cyanotic heart disease. The clinical findings as well as the classic X-ray description point towards a diagnosis of transposition of great vessels which is caused by the failure of the aortopulmonary septum to spiral during early life.

Absent tricuspid valve and hypoplastic right ventricle are seen in tricuspid atresia (cyanotic heart defect).

Anterosuperior displacement of the infundibular septum is seen in Tetralogy of Fallot (cyanotic heart defect). The x-ray in this condition would show a 'boot-shaped' heart.

A defect in the interatrial septum is present in the atrial septal defect (non-cyanotic).

Aortic narrowing near the insertion of ductus arteriosus occurs in aortic coarctation.

Dr Assem

A patient presents with an inability to abduct his right shoulder. Which nerve supplies the deltoid muscle?

- ☐ Lateral cutaneous
- ☐ Suprascapular
- ☐ Musculocutaneous
- ☐ Axillary
- ☐ Median

Lateral cutaneous

8%

Suprascapular

16%

Musculocutaneous

14%

Axillary

58%

Median

5%

Shoulder abduction - deltoid muscle - axillary nerve (C5,C6)

Important for me

Less important

Which one of the following serum proteins is most likely to increase in a patient with severe pneumococcal pneumonia?

- ☐ Transferrin
- ☐ Transthyretin
- ☐ Ferritin
- ☐ Albumin
- ☐ Cortisol binding protein

Transferrin

12%

Transthyretin

10%

Ferritin

65%

Albumin

6%

Cortisol binding protein

8%

Dr Assem

What level of evidence does a randomised control trial offer?

☐ Ia

☐ Ib

☐ IIa

☐ IIb

☐ IV

Ia

21%

Ib

39%

IIa

16%

IIb

13%

IV

11%

Each one of the following promotes the release of endothelin, except:

- ☐ Prostacyclin
- ☐ ADH
- ☐ Angiotensin II
- ☐ Hypoxia
- ☐ Mechanical shearing force

Prostacyclin

35%

ADH

27%

Angiotensin II

14%

Hypoxia

15%

Mechanical shearing force

9%

A study is designed to assess the efficacy of a new anti-hypertensive medication. Two groups of patients are randomly assigned, one to take the established drug for 3 months whilst the other takes the new drug for 3 months. Blood pressure is measured before and after the intervention. There is then a period off medication for 1 month. After this period has elapsed the medication that the groups receive is swapped around and again blood pressure is measured before and 3 months later. The difference in blood pressure after the respective medications is calculated for each patient. Which one of the following significance tests is it most appropriate to apply?

☐ Student's unpaired t-test

☐ Student's paired t-test

☐ Pearson's test

☐ Mann-Whitney test

☐ Chi-squared test

Student's unpaired t-test

16%

Student's paired t-test

47%

Pearson's test

11%

Mann-Whitney test

11%

Chi-squared test

15%

This describes a crossover study. As we are comparing parametric data from the same patients (they swapped medication halfway through the study) the Student's paired t-test should be used.

Dr. Assem

A 1-year-old girl is noted to have a continuous murmur, loudest at the left sternal edge. She is not cyanosed. A diagnosis of patent ductus arteriosus is suspected. What pulse abnormality is most associated with this condition?

- ☐ Collapsing pulse
- ☐ Bisferiens pulse
- ☐ Pulsus paradoxus
- ☐ 'Jerky' pulse
- ☐ Pulsus alternans

Collapsing pulse

46%

Bisferiens pulse

18%

Pulsus paradoxus

12%

'Jerky' pulse

12%

Pulsus alternans

13%

Patent ductus arteriosus - large volume, bounding, collapsing pulse

Important for me

Less Important

A 3-year-old boy has been brought into the GP surgery by his parents. He presents with pallor, lethargy and enlargement of the abdomen. The boy's parents said that they only noticed these symptoms for the past 2 weeks but it has been gradually worsening over the longer period. The boy was born in the UK by normal vaginal delivery following an uncomplicated pregnancy. There is no significant past medical history or recent travel history. The mother reports a family history of a form of metabolic disorder but couldn't remember the name. On examination, there is generalised pallor. There is enlargement of the abdomen with massive splenomegaly which is firm but not tender. Hepatomegaly is also noted. There is no jaundice or lymphadenopathy.

What is the most likely diagnosis?

- ☐ Gaucher's disease
- ☐ Heart failure
- ☐ Chronic myeloid leukaemia
- ☐ Acute myeloid leukaemia
- ☐ Kala azar

Gaucher's disease

68%

Heart failure

5%

Chronic myeloid leukaemia

6%

Acute myeloid leukaemia

10%

Kala azar

10%

Gaucher's disease is the most common lipid storage disorder and a cause of hepatosplenomegaly

Important for me Less important

Gaucher's disease is an autosomal recessive disease and it is the most common lipid storage disorder. It's a cause of hepatosplenomegaly. The family history in the history indicates Gaucher's disease as the most likely.

Heart failure is unusual in children and does not usually cause massive splenomegaly.

Chronic myeloid leukaemia can cause massive splenomegaly but it is unusual in children.

Acute myeloid leukaemia can cause splenomegaly but massive splenomegaly is rare. It is not usually inherited.

Kala azar, also known as visceral leishmaniasis, is a cause of massive splenomegaly but given the lack of travel history, it is unlikely.

Dr Assem

A study is performed to find the normal reference range for IgE levels in adults. Assuming IgE levels follow a normal distribution, what percentage of adults will have an IgE level higher than 2 standard deviations from the mean?

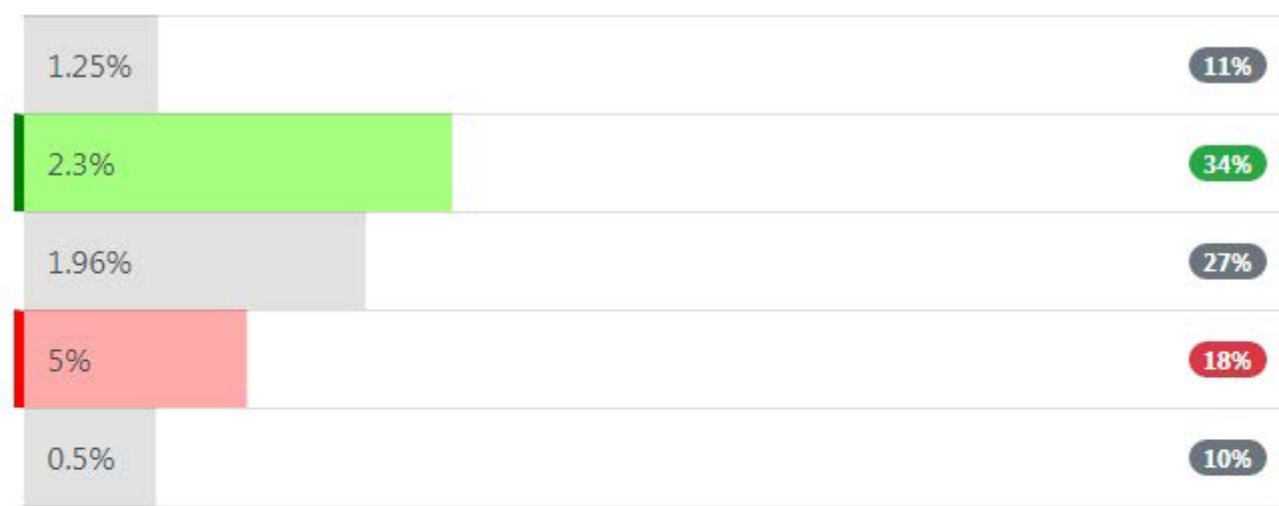
☐ 1.25%

☐ 2.3%

☐ 1.96%

☐ 5%

☐ 0.5%



For normally distributed data 95.4% of values lie within 2 standard deviations of the mean, leaving 4.6% outside this range. Therefore 2.3% of values will be higher and 2.3% will be lower than 2 standard deviations from the mean. This figure is sometimes approximated to 2.5%

Dr Assem

Which one of the following is true regarding *Escherichia coli* infection?

- ☐ It is a Gram negative coccus
- ☐ E coli is an important cause of neonatal meningitis
- ☐ The O157:H7 strain is typically spread via shellfish
- ☐ Severe infection should be treated with teicoplanin
- ☐ It is an aerobic bacteria

It is a Gram negative coccus

19%

E coli is an important cause of neonatal meningitis

42%

The O157:H7 strain is typically spread via shellfish

16%

Severe infection should be treated with teicoplanin

7%

It is an aerobic bacteria

16%

Escherichia coli is classified as a facultative anaerobe

Dr Assef

You are working in oncology in the breast cancer division. A 30-year-old lady has been referred to you by her GP with a mass in her left breast. She underwent treatment for a sarcoma of the left deltoid muscle one year previously. She has a family history of cancer. Her mother died of a brain tumour in her mid 40's and her brother died of an osteosarcoma in his early teens. A mutation in which gene is accountable for this syndrome?

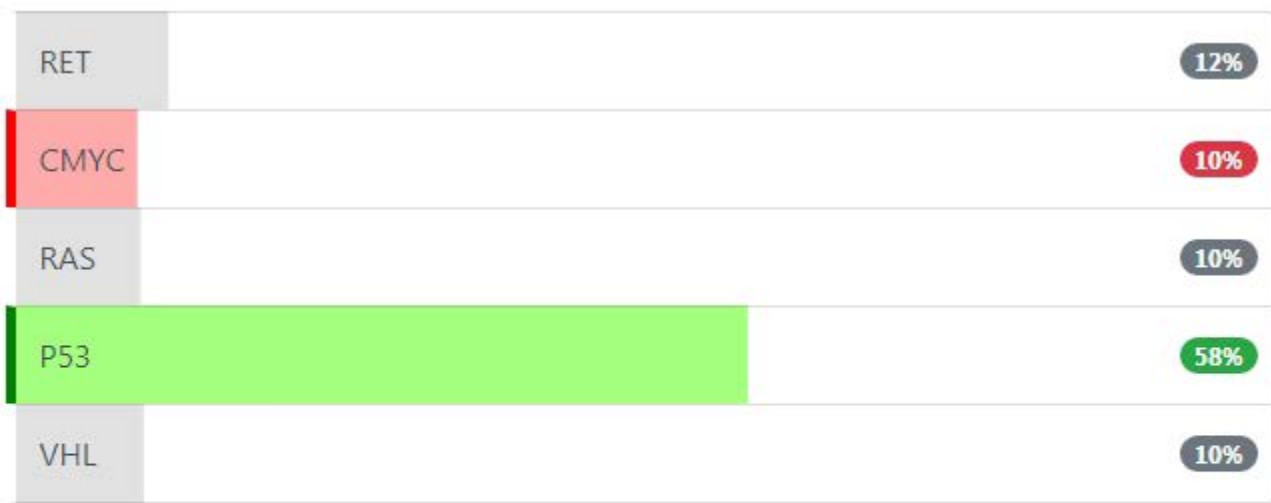
☐ RET

☐ CMYC

☐ RAS

☐ P53

☐ VHL



A mutation in the P53 gene can cause Li-Fraumeni syndrome which can present with soft tissue sarcomas, breast carcinoma, glioblastoma, lymphoma and leukaemia. It is a rare autosomal dominant disorder.

A 23-year-old man is admitted with sepsis. Blood cultures are reported as follows:

Neisseria gonorrhoeae

Which of the following complement proteins is the patient most likely to be deficient in?

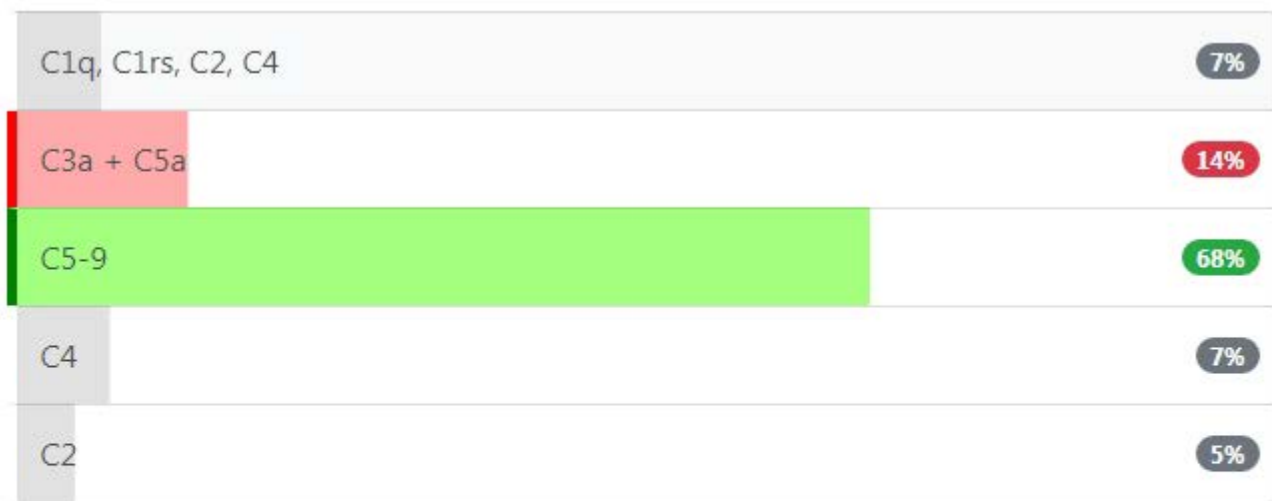
☐ C1q, C1rs, C2, C4

☐ C3a + C5a

☐ C5-9

☐ C4

☐ C2



Whilst C3 deficiency is associated with recurrent bacterial infections, C5 deficiency is more characteristically associated with disseminated meningococcal infection and other Gram negative diplococcal infections

A 33-year-old female is referred to the endocrine clinic. She has missed her last two periods and has been lactating. She has gained weight and complains of vaginal dryness. The endocrinologist chooses to measure her prolactin levels. Which hormone is responsible for inhibiting prolactin release from the pituitary gland?

- ☐ Thyrotropin releasing hormone
- ☐ Oestrogen
- ☐ Gonadotropin releasing hormone
- ☐ Luteinising hormone
- ☐ Dopamine

Thyrotropin releasing hormone	8%
Oestrogen	8%
Gonadotropin releasing hormone	12%
Luteinising hormone	9%
Dopamine	62%

Prolactin release is persistently inhibited by dopamine

Important for me Less important

Dopamine persistently inhibits prolactin. Prolactin release is upregulated by thyrotropin-releasing hormone and oestrogen. Prolactin has an inhibitory effect on gonadotropin-releasing hormone and luteinising hormone.

Which one of the following is not associated with hypocalcaemia combined with a raised phosphate level?

- ☐ Chronic renal failure
- ☐ Pseudohypoparathyroidism
- ☐ Hypoparathyroidism
- ☐ Osteomalacia
- ☐ Acute rhabdomyolysis

Which one of the following is not associated with hypocalcaemia combined with a raised phosphate level?

Chronic renal failure

11%

Pseudohypoparathyroidism

21%

Hypoparathyroidism

11%

Osteomalacia

38%

Acute rhabdomyolysis

19%

Osteomalacia causes hypocalcaemia associated with a low serum phosphate, rather than a raised phosphate level.

Which one of the following occurs during reverse transcriptase polymerase chain reaction?

- ☐ Proteins are converted to DNA
- ☐ DNA is converted to RNA
- ☐ Used to amplify DNA
- ☐ RNA is converted to DNA
- ☐ Proteins are converted to RNA

Proteins are converted to DNA

3%

DNA is converted to RNA

18%

Used to amplify DNA

12%

RNA is converted to DNA

62%

Proteins are converted to RNA

5%

A 45-year-old female is brought to the emergency department by an ambulance after she was found collapsed on the street by a bystander. Within a few minutes of arrival she developed severe abdominal pain and became severely agitated.

Her respiratory rate is 35 breaths per minute, heart rate 110 beats per minute, temperature 39.3°C. Her prothrombin time and activated partial thromboplastin time are increased, and her fibrinogen levels are lower than normal. Her D-dimer is positive.

Hb	96 g/l
Platelets	$85 \times 10^9/l$
WBC	$14 \times 10^9/l$

Blood smears are sent to the laboratory.

What is most likely to be seen in the blood smears?

- ☐ Heinz bodies
- ☐ Bite cells
- ☐ Dacrocytes
- ☐ Schistocytes
- ☐ Elliptocytes

Dr Assem

Heinz bodies

18%

Bite cells

11%

Dacrocyes

7%

Schistocytes

58%

Elliptocytes

7%

Schistocytes are seen on blood smears in DIC

Important for me Less important

Also known as 'consumptive coagulopathy,' DIC is a syndrome in which the coagulation cascade is activated to the point in which normal mechanisms of clotting are exhausted, which in turn produces unchecked haemorrhage.

Typically, haemostasis is maintained by maintaining a balance between clot formation (i.e. coagulation) and breakdown (i.e. fibrinolysis). Thrombin is produced through the activation of the coagulation cascade. Thrombin converts fibrinogen to fibrin (the final product of clotting). Fibrinolysis is the breakdown of fibrinogen and fibrin. In the presence of thrombin, a substance called plasmin is generated, breaking down formed clots. Fibrin degradation products (FDPs) or fibrin split products (FSPs) are produced as a result. Thrombin plays a key role in hemostasis, in both coagulation and fibrinolysis.

Patients with DIC can present with a wide range of abnormalities in their laboratory values. Typically, prolonged coagulation times, thrombocytopenia, high levels of fibrin degradation products (FDPs), elevated D-dimer levels, and microangiopathic pathology (schistocytes) on peripheral smears are suggestive findings.

The activation of the cascade leads to thrombi formation which causes an accumulation of excess fibrin formation in the intravascular circulation. The excess fibrin strands cause mechanical damage to the red blood cells resulting in schistocyte formation and also thrombocytopenia and consumption of clotting factors.

A bite cell is an abnormally shaped red blood cell with one or more semicircular portions removed from the cell margin. These "bites" result from the removal of denatured haemoglobin by macrophages in the spleen. Glucose-6-phosphate dehydrogenase deficiency (G6PD), in which uncontrolled oxidative stress causes haemoglobin to denature and form Heinz bodies, is a common disorder that leads to the formation of bite cells.

The Heinz Bodies are seen as antigenic and are quickly phagocytosed. Because the Heinz Bodies are derivatives of haemoglobin, they are located inside the cell, and thus phagocytosis takes a significant "bite" out of the cell.

Dacrocyes (teardrop cells) are usually characteristic of myelofibrosis and seen with marrow disorders or marrow infiltrations, really because of improper production of blood cells from the bone marrow. In post-splenectomy patients, the number of dacrocyes drastically increases, since the spleen cannot remove the improperly formed cells.

Red cells varying in shape from elongated to oval, and rich in haemoglobin, are called elliptocytes. They can be seen in hereditary disorders, such as hereditary elliptocytosis, or in acquired disorders, such as iron deficiency anaemia, infectious anaemias, thalassaemia, and in newborn babies.

A 29-year-old man presents with a productive cough, fever and pleuritic chest pain. A chest x-ray shows lobar consolidation and a sputum culture grows *Haemophilus influenzae*. This is his fourth chest infection in the past seven months. *Streptococcus pneumoniae* has been grown from the sputum of the previous three episodes. Six-weeks following the latest infection a full blood count, urea and electrolytes, CRP and chest x-ray are all reported as normal. What is the most appropriate next investigation?

- ☐ Serum immunoglobulins
- ☐ Spirometry
- ☐ HIV test
- ☐ Colonoscopy
- ☐ Urinalysis

A 29-year-old man presents with a productive cough, fever and pleuritic chest pain. A chest x-ray shows lobar consolidation and a sputum culture grows *Haemophilus influenzae*. This is his fourth chest infection in the past seven months. *Streptococcus pneumoniae* has been grown from the sputum of the previous three episodes. Six-weeks following the latest infection a full blood count, urea and electrolytes, CRP and chest x-ray are all reported as normal. What is the most appropriate next investigation?

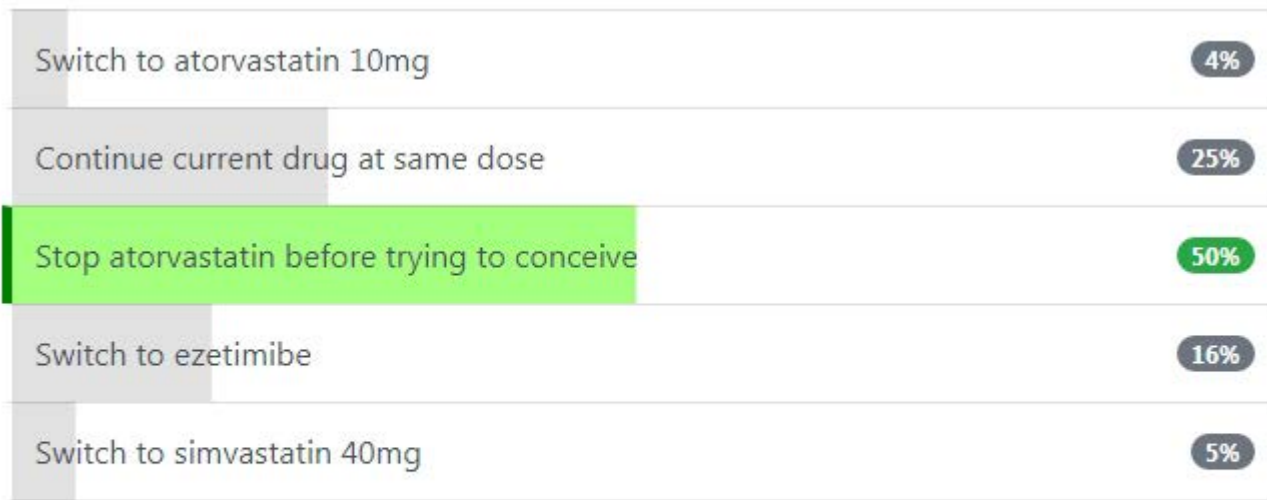
Serum immunoglobulins	55%
Spirometry	7%
HIV test	30%
Colonoscopy	4%
Urinalysis	4%

This patient has had repeated infections with encapsulated bacteria which should raise the suspicion of immunoglobulin deficiency. HIV would be suggested by infections associated with impaired cellular immunity.

Dr Assem

A 33-year-old woman who is known to have familial hypercholesterolaemia comes for review. She is planning to have children and asks for advice regarding medication as she currently takes atorvastatin 80mg on. What is the most appropriate advice?

- ☐ Switch to atorvastatin 10mg
- ☐ Continue current drug at same dose
- ☐ Stop atorvastatin before trying to conceive
- ☐ Switch to ezetimibe
- ☐ Switch to simvastatin 40mg



Statins should be discontinued in women 3 months before conception due to the risk of congenital defects

Which one of the following is in direct anatomical contact with the left kidney?

☐ Stomach

☐ Distal part of small intestine

☐ Spleen

☐ Pancreas

☐ Duodenum

Stomach

6%

Distal part of small intestine

9%

Spleen

34%

Pancreas

40%

Duodenum

11%

Which one of the following significance tests is used to analyse data which is measured and follows a normal distribution?

- ☐ Chi-squared test
- ☐ Spearman's rank correlation coefficient
- ☐ Wilcoxon matched-pairs
- ☐ Mann-Whitney test
- ☐ Student's t-test

Chi-squared test

17%

Spearman's rank correlation coefficient

10%

Wilcoxon matched-pairs

6%

Mann-Whitney test

11%

Student's t-test

57%

Student's t-test is used to analyse parametric data. The other tests are used on non-parametric data

Which one of the following stimulates the release of gastrin from G-cells?

- ☐ Histamine
- ☐ Somatostatin
- ☐ Gastric acid
- ☐ Cholecystikinin
- ☐ Luminal peptides

Histamine

13%

Somatostatin

10%

Gastric acid

27%

Cholecystokinin

11%

Luminal peptides

39%

Which of the following statements is true regarding hyponatraemia?

- ☐ In a dehydrated patient with urinary sodium $< 20\text{mmol/L}$ it may be due to the diuretic stage of renal failure
- ☐ SIADH typically leads to urine osmolality of $< 500\text{ mmol/kg}$
- ☐ Hyperlipidaemia may cause pseudohyponatraemia
- ☐ Cardiac failure and liver cirrhosis may lead to primary hyperaldosteronism
- ☐ It is known to cause a long QT interval

In a dehydrated patient with urinary sodium $< 20\text{mmol/L}$ it may be due to the diuretic stage of renal failure

16%

SIADH typically leads to urine osmolality of $< 500\text{ mmol/kg}$

14%

Hyperlipidaemia may cause pseudohyponatraemia

49%

Cardiac failure and liver cirrhosis may lead to primary hyperaldosteronism

12%

It is known to cause a long QT interval

8%

A 35-year-old male presents to the clinic with bilateral pitting oedema, lower limb pain and tingling in both arms. On examination, tiny, painless papules were noticed on his abdomen and a whorl-like corneal pattern of cream-coloured lines in the patient's cornea. He has no significant past medical history.

Hb	131 g/l	Na ⁺	137 mmol/l
Platelets	330 * 10 ⁹ /l	K ⁺	4.7 mmol/l
WBC	7.2 * 10 ⁹ /l	Urea	12.9 mmol/l
Neuts	3.7 * 10 ⁹ /l	Creatinine	150 µmol/l
Lymphs	1.9 * 10 ⁹ /l	CRP	12 mg/l

C3	1.49 g/l
C4	0.3 g/l
Anti-nuclear antibodies	negative
Anti-neutrophil cytoplasmic antibodies	negative

His urine dip showed proteinuria and the 24 hour protein urine collection was quantified at 1.8 gram/day. What is the most likely diagnosis?

- ☒ Gaucher's disease
- ☐ Hypercholesterolaemia
- ☐ Fabry's disease
- ☐ Amyloidosis
- ☐ IgA nephropathy

Gaucher's disease	18%
Hypercholesterolaemia	5%
Fabry's disease	44%
Amyloidosis	22%
IgA nephropathy	11%

The patient presented with nephrotic syndrome and sensory neuropathy bilaterally in the arms. Of the above options, Fabry's disease and amyloidosis can present as such. The painless papules on the abdomen are angiokeratomas and the corneal findings are characteristic of cornea verticillata, both of which are suggestive fabry's disease. None of the other 4 options presents with such characteristic clinical signs.

Fabry's disease is an X-linked recessive disorder characterised by abnormal deposits of a particular fatty substance called globotriaosylceramide in blood vessel walls throughout the body. The primary defect which allows this to occur is the inherited deficiency of the enzyme, alpha-galactosidase A, which is normally responsible for the breakdown of globotriaosylceramide.

This abnormal accumulation of fatty substance results in the narrowing of blood vessels and a whole range of symptoms and signs which include:

- Limb pain
- Sensory neuropathy
- Raynaud's disease
- Cardiac arrhythmias, cardiomyopathy
- Nephrotic syndrome
- Dermatological manifestation; angiokeratomas, anhidrosis, cornea verticillata

A 26-year-old gentleman has been recently diagnosed with an intracranial neoplasm. His family history includes that of multiple carcinomas. These include breast, bone and colon cancer. A diagnosis of Li-Fraumeni is suspected.

What is the likely gene defect causing this condition?

☐ APC

☐ NF1

☐ p53

☐ WT1

☐ BRCA1

APC	9%
NF1	6%
p53	69%
WT1	9%
BRCA1	7%

The answer is the p53 tumour suppressor gene.

Li-Fraumeni is an autosomal dominant disorder characterised by multiple cancers such as leukaemias, sarcomas, brain, breast and adrenal malignancies.

The other answers are all tumour suppressor genes. APC is associated with colorectal cancer, NF1 with neurofibromatosis, WT1 with Wilms tumour, and BRCA1 with breast and ovarian cancer.

You have been asked to investigate the potential benefit of setting up a service to help patients with multiple sclerosis in the local area. What is the most important factor when determining how many resources will be required?

- ☐ Incidence
- ☐ Bayesian factor
- ☐ Prevalence
- ☐ Denominator data
- ☐ P value

Incidence

12%

Bayesian factor

8%

Prevalence

63%

Denominator data

8%

P value

9%

A 40-year-old woman with rheumatoid arthritis is diagnosed as having type 1 renal tubular acidosis. Which one of the following features is most likely to be seen as a consequence?

- ☐ Hyperkalaemia
- ☐ Osteomalacia
- ☐ Decreased bicarbonate reabsorption in the proximal tubule
- ☐ Raised anion gap metabolic acidosis
- ☐ Nephrocalcinosis

Hyperkalaemia

16%

Osteomalacia

9%

Decreased bicarbonate reabsorption in the proximal tubule

21%

Raised anion gap metabolic acidosis

18%

Nephrocalcinosis

36%

Hypokalaemia, nephrocalcinosis - type 1 renal tubular acidosis

Important for me Less important

Osteomalacia is more commonly seen in type 2 renal tubular acidosis.

A 37-year-old female patient presents to the GP surgery with a 6-months history of joint pains. She reports the joint pains mainly involve the elbows, knees, joints in the fingers and toes. She has an erythematous rash covering the cheeks, sparing the nasolabial folds. She reports the rash was worse when she went to Spain on holiday.

What is the most common complement deficiency associated with this condition?

- ☐ C5-9 deficiency
- ☐ C5 deficiency
- ☐ C1 inhibitor (C1-INH) protein deficiency
- ☐ C3 deficiency
- ☐ C1q, C1rs, C2 and C4 deficiency

C5-9 deficiency	8%
C5 deficiency	10%
C1 inhibitor (C1-INH) protein deficiency	10%
C3 deficiency	28%
C1q, C1rs, C2 and C4 deficiency	44%

Deficiency in C1q, C1rs, C2 and C4 predisposes to immune complex disease such as SLE

Important for me Less important

This lady has signs of systemic lupus (SLE). Deficiency in C1q, C1rs, C2 and C4 predisposes to immune complex disease such as SLE.

C5-9 predisposes to *Neisseria meningitidis* infections.

C3 deficiency causes recurrent bacterial infections.

C5 deficiency predisposes to Leiner disease

C1 inhibitor (C1-INH) protein deficiency causes hereditary angioedema.

A 42-year-old male patient presents to the GP surgery with a 6-months history of progressive weakness of both lower limbs. He complains of difficulty climbing stairs, lethargy and muscle loss in the lower limbs. He had a history of type 2 diabetes mellitus and admits to heavy alcohol use for the last 4 years. On examination, there is a marked loss of fine touch and proprioception in a stocking distribution bilaterally. There is no evidence of ataxia.

What is the likely diagnosis?

- ☐ Wernicke's encephalopathy
- ☐ Wet beriberi
- ☐ Pellagra
- ☐ Dry beriberi
- ☐ Abetalipoproteinaemia

Wernicke's encephalopathy

12%

Wet beriberi

15%

Pellagra

18%

Dry beriberi

46%

Abetalipoproteinaemia

10%

Dry beriberi is caused by thiamine deficiency and causes peripheral neuropathy

Important for me Less important

This patient has a rapidly progressive polyneuropathy. Given the alcohol history, the most likely diagnosis from the options is dry beriberi, caused by thiamine deficiency.

Wernicke's encephalopathy is also caused by thiamine deficiency but it does not usually involve peripheral neuropathy.

Wet beriberi is another manifestation of thiamine deficiency but it causes heart failure.

Pellagra is caused by vitamin B3 deficiency which causes dermatitis, dementia and diarrhoea.

Abetalipoproteinaemia is caused by vitamin E deficiency which can present with peripheral neuropathy and cerebellar ataxia. The absence of ataxia here makes dry beriberi more likely.

A 70-year-old male presents for advice regarding hyperlipidaemia. In the recent past he has trialled diet modification and exercise. He has a past history of hypertension and Type 2 diabetes, and his medications include aspirin, perindopril and metformin. He has a family history of his brother and mother having a coronary artery bypass grafting.

Total cholesterol	5	(Normal <5.2)
LDL cholesterol	2.5	(Normal <3.5)
HDL	1.1	(Normal >1)
Triglycerides	2.3	(Normal <1.5)

Which would be the most appropriate management choice to reduce his risk of cardiovascular events?

☐ Cholestyramine

☐ Atorvastatin

☐ Ezetimibe

☐ Gemfibrozil

☐ Omega 3 fatty acids

Cholestyramine

6%

Atorvastatin

55%

Ezetimibe

15%

Gemfibrozil

15%

Omega 3 fatty acids

10%

The patient has an isolated hypertriglyceridaemia and significant cardiac risk factors. This is what the question is trying to demonstrate. While fibrates are well known to be effective against hypertriglyceridaemias, his risk factor burden is enough that a statin (which is also functional on triglyceride levels, not just LDLs) is the first choice in this situation. In particular, fibrates have not been shown to reduce cardiovascular events in the presence of diabetes, while statins have.

Thus, an isolated hypertriglyceridaemia in the presence of significant cardiovascular risk factors, in a patient not currently on a statin, should be managed with the introduction of a statin.

Dr. Assem

A 25-year-old man presents to endocrinology clinic for review. He has been referred with a sodium of 130mmol/L. He feels well in himself and denies any systemic symptoms and specifically has no headaches or neurological symptoms. He has been passing normal volumes of urine. He has a past medical history of familial hypercholesterolemia and is under review by a metabolic team as he still has a total cholesterol of 9.1mmol/L. Paired osmolalities are normal. Urine dipstick test is normal. His examination is largely normal apart from evidence of xanthomas. U&E, FBC, LFTs are normal. What is the most likely diagnosis?

- ☐ Pseudohyponatraemia
- ☐ Nephrogenic SIADH
- ☐ Cranial SIADH
- ☐ Diabetes insipidus
- ☐ Type two diabetes mellitus

Pseudohyponatraemia	78%
Nephrogenic SIADH	6%
Cranial SIADH	6%
Diabetes insipidus	5%
Type two diabetes mellitus	5%

The correct answer is pseudo hyponatraemia. This is a patient with clinical and biochemical evidence of very high cholesterol levels in addition to his mild hyponatraemia. The normally paired osmolalities exclude SIADH and diabetes insipidus, whilst the absence of glucosuria makes diabetes an unlikely cause.

A 46-year-old female is referred to the dermatologist for a rash on both her elbows. The rash is red, is papulovesicular in nature, and looks like it has many small blisters. The dermatologist diagnoses her with dermatitis herpetiformis. Which HLA haplotype is this associated with?

☐ HLA-A3

☐ HLA-B5

☐ HLA-DR3

☐ HLA-DR4

☐ HLA-B27

HLA-A3

9%

HLA-B5

10%

HLA-DR3

50%

HLA-DR4

17%

HLA-B27

14%

Dermatitis herpetiformis is associated with HLA-DR3

Important for me [Less important](#)

Dermatitis herpetiformis is an autoimmune condition associated with HLA-DR3.

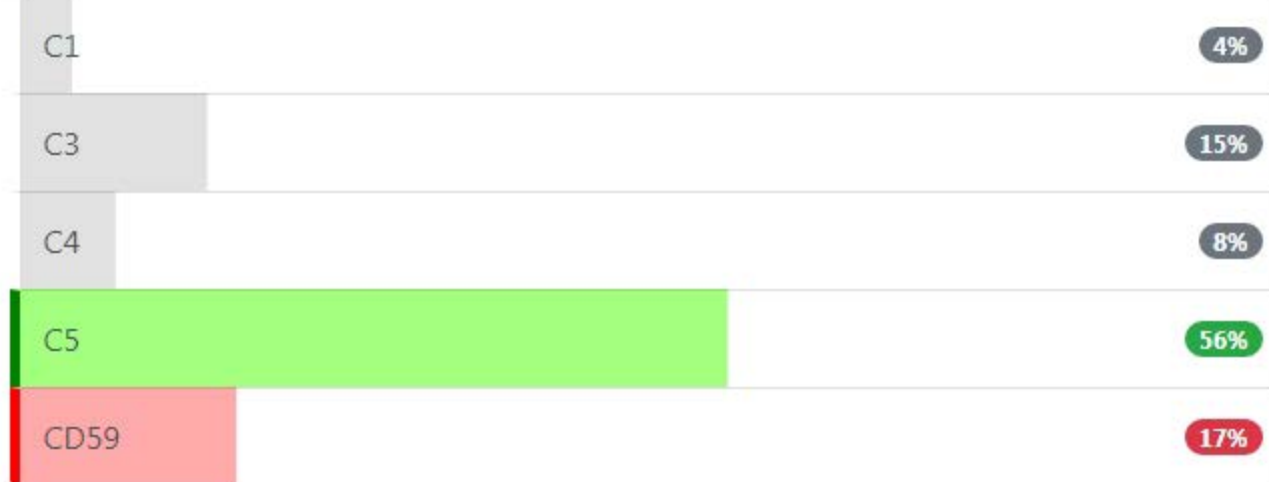
HLA-A3 is associated with haemochromatosis. HLA-B5 is most commonly associated with Behcet's disease. HLA-DR4 is associated with both type 1 diabetes mellitus and rheumatoid arthritis. HLA-B27 is most commonly associated with several diseases, most commonly ankylosing spondylitis.

Dr. Assem

An 18-year-old man is seen in the infectious diseases clinic some 6 weeks after admission to the Emergency department with meningococcal meningitis. This was confirmed on lumbar puncture and represented his second episode of meningitis over the last 6 months. He has no other past medical history and takes no regular medication.

Which of the following is most likely to be deficient?

- ☐ C1
- ☐ C3
- ☐ C4
- ☐ C5
- ☐ CD59



C5 is cleaved into C5a and C5b, C5a is involved in chemotaxis, and C5b forms the first part of the membrane attack complex. Deficiencies of the membrane attack complex, (C5-C9) are particularly associated with meningococcal infection. C5 activation may also have a role in progression of fibrotic liver disease.

Deficiencies of the C1 complex are recognised to be closely associated with the development of systemic lupus erythematosus. C3 deficiency is associated with a predisposition to infection with capsulated bacterial infections such as pneumococcus and Haemophilus which begins quite soon after birth. C4 deficiency is rare and is associated with early onset systemic lupus erythematosus. CD59 deficiency is involved in the pathogenesis of paroxysmal nocturnal haemoglobinuria.

A 90-year-old man is admitted to hospital. He is taking no regular medication. On admission his blood pressure is 170/68 mmHg. Which one of the following is the main factor which accounts for the large pulse pressure?

- ☐ Calcified brachial arteries
- ☐ Autonomic dysfunction
- ☐ Reduced aortic compliance
- ☐ Reduced left ventricular ejection fraction
- ☐ Reduced circulating volume

Calcified brachial arteries

20%

Autonomic dysfunction

10%

Reduced aortic compliance

56%

Reduced left ventricular ejection fraction

9%

Reduced circulating volume

6%

You are working in general medicine. You are on the ward round and see a 40-year-old patient who has been admitted with a very swollen and painful right knee. He was unable to walk on it so came into hospital. It is currently being treated as gout with non steroidal anti-inflammatory drugs. You notice he is of short stature, has shortened arms and legs and a flat nasal bridge. A mutation in which gene is responsible for this condition?

- ☐ Fibroblast growth factor receptor
- ☐ Vascular endothelial growth factor receptor
- ☐ Mesodermal growth factor receptor
- ☐ Epidermal growth factor receptor
- ☐ Tyrosine kinase receptor

Fibroblast growth factor receptor	41%
Vascular endothelial growth factor receptor	9%
Mesodermal growth factor receptor	12%
Epidermal growth factor receptor	22%
Tyrosine kinase receptor	16%

The condition described is achondroplasia. This is due to a gain of function mutation in the FGFR3 (fibroblast growth factor receptor) gene. It is an autosomal dominant condition.

The vascular endothelial growth factor receptor is inhibited by certain monoclonal antibodies in some cancers and in wet macular degeneration by bevacizumab injections. The epidermal growth factor receptor and tyrosine kinase receptor are again inhibited by certain anti-cancer drugs. The mesodermal growth factor receptor is made up.

A 36-year-old woman presents with a 3 week history of weakness worse at the end of the day. In particular she noticed difficulty getting out of her chair in the evening. Her husband has noticed that whilst driving at night she complains of difficulty keeping her eyes open, despite not being tired.

On examination you note a bilateral facial nerve weakness, complex ophthalmoplegia and symmetrical proximal power loss (MRC power 4/5). Upon repetitive stimulation of movements fatigability is noted.

What Gell and Coombs hypersensitivity class is she likely to be suffering from?

☐ Type 1
☐ Type 2
☐ Type 3
☐ Type 4
☐ Type 5

Dr Assem



The patient is a young female presenting with a proximal myopathy with complex ophthalmoplegia with evidence of fatigability. This picture is classic for myasthenia gravis. An autoimmune disease caused by antibodies to acetylcholine nicotinic postsynaptic receptors.

A 34-year-old female is referred to the oncologist due to a suspicion of lymphoma. She has suffered from a fever and night sweats. Moreover, she has previously suffered from glandular fever. On examination, her cervical lymph nodes are swollen. She undergoes a lymph node biopsy with staining for a cell surface marker. This reveals the presence of Reed-Sternberg cells, confirming a diagnosis of Hodgkin's lymphoma. Which cell surface marker is associated with Reed-Sternberg cells?

- ☐ CD3
- ☐ CD4
- ☐ CD15
- ☐ CD16
- ☐ CD21



CD15 is found on Reed-Sternberg cells

Important for me [Less important](#)

CD15 is found on Reed-Sternberg cells. Reed-Sternberg cells are found in those with Hodgkin's lymphoma.

CD3 is found on all T cells. CD4 is found on T helper cells. CD16 binds to the Fc portion of IgG. CD21 is the receptor for the Epstein-Barr virus.

A 54-year-old woman with a history of rheumatoid arthritis presents with a one week history of bloody diarrhoea. This has been associated with fever and abdominal pain. Her rheumatoid is normally well controlled with methotrexate. A stool sample is sent which shows *Campylobacter jejuni*. What is the most appropriate management?

- ☐ Fluids alone
- ☐ Fluids + metronidazole
- ☐ Fluids + ciprofloxacin
- ☐ Fluids + clarithromycin
- ☐ Fluids + mebendazole

Fluids alone

17%

Fluids + metronidazole

26%

Fluids + ciprofloxacin

26%

Fluids + clarithromycin

26%

Fluids + mebendazole

5%

This lady is immunocompromised on methotrexate and a severe infection (fever, bloody diarrhoea and prolonged history). She should therefore be given an antibiotic. The BNF advise clarithromycin first-line.

A new blood test is developed to screen for prostate cancer. Trials have shown it has a sensitivity for detecting clinically significant prostate cancer of 80% but a specificity of 60%. What is the likelihood ratio for a positive test result?

☐ Cannot be calculated

☐ 2

☐ 4

☐ 0.8

☐ 0.2

Cannot be calculated

19%

2

37%

4

12%

0.8

20%

0.2

12%

Likelihood ratio for a positive test result = sensitivity / (1 - specificity)

Important for me Less important

Likelihood ratio for a positive test result = sensitivity / (1 - specificity)

= 0.8 / (1 - 0.6) = 2

You are performing a study of blood pressure readings in patients with chronic kidney disease. Assuming that the results are normally distributed, what percentage of values lie within two standard deviations of the mean blood pressure reading?

☐ 95.4%

☐ 5.3%

☐ 98.3%

☐ 10%

☐ 97.5%

95.4%

66%

5.3%

3%

98.3%

10%

10%

4%

97.5%

16%

A 43-year-old man requests a 'medical' as he is concerned about his risk of heart disease. His father died at the age of 45-years following a myocardial infarction. His lipid profile is as follows:

HDL	1.4 mmol/l
LDL	5.7 mmol/l
Triglycerides	2.3 mmol/l
Total cholesterol	8.2 mmol/l

Clinical examination reveals tendon xanthomata around his ankles. What is the most likely diagnosis?

- ☐ Familial hypercholesterolaemia (heterozygous)
- ☐ Nephrotic syndrome
- ☐ Mixed hyperlipidaemia
- ☐ Familial hypercholesterolaemia (homozygous)
- ☐ Hypothyroidism

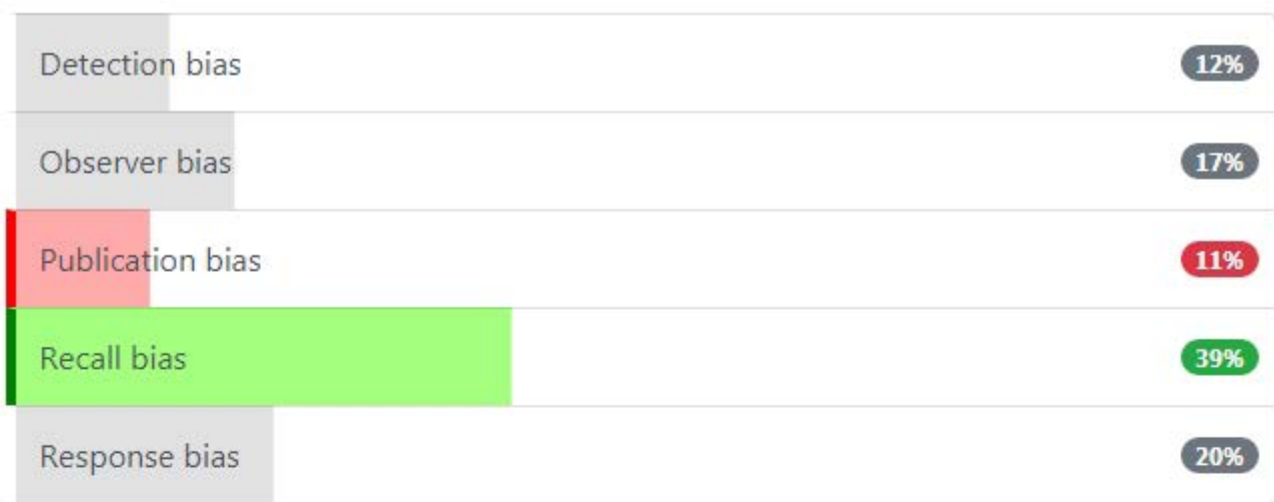
Familial hypercholesterolaemia (heterozygous)	53%
Nephrotic syndrome	3%
Mixed hyperlipidaemia	8%
Familial hypercholesterolaemia (homozygous)	31%
Hypothyroidism	4%

The presence of tendon xanthomata and cholesterol levels meet the diagnostic criteria for familial hypercholesterolaemia. Homozygous familial hypercholesterolaemia is exceedingly rare - most patients die in their teenage years from a myocardial infarction.

An intercalating medical student conducts a case-control study for her dissertation, examining the life-long exposure to marijuana in groups of patients with and without COPD.

What form of bias is this study type most at risk of?

- ☐ Detection bias
- ☐ Observer bias
- ☐ Publication bias
- ☐ Recall bias
- ☐ Response bias



Recall bias is a particular problem in case-control studies

Important for me Less important

All doctors must practice evidence-based medicine, as outlined by the GMC. This means that it is crucial for all doctors to have an understanding of how to critically appraise a paper, which involves detecting potential sources of bias in the papers that you read. This is something that is commonly tested in medical school finals.

Case-control studies are particularly susceptible to recall bias, as those with COPD may relate their condition to their previous marijuana use and are therefore more likely to remember whether or not they have used marijuana in the past (and the extent of their previous use) than the patients in the control group who do not have COPD.

- Detection bias: Outcomes are sought after more in one group than in another
- Observer bias: There is observer subjectivity about the outcome
- Publication bias: Studies that report negative findings are less likely to be published
- Recall bias: Patients are more likely to recall exposures that they believe are related to the outcome
- Response bias: Those who respond to a questionnaire / volunteer for a trial are not representative of the population

You are designing a research project looking at the sensitivities and specificities of various markers in relation to myocardial necrosis. Specifically you want to assess the molecule which troponin C binds to.

Which molecule will you study in your research project?

- ☐ Calcium ions
- ☐ Tropomyosin
- ☐ Actin
- ☐ Myosin
- ☐ Sarcoplasmic reticulum

Calcium ions	45%
Tropomyosin	24%
Actin	13%
Myosin	12%
Sarcoplasmic reticulum	6%

Troponin C binds to calcium ions

Important for me [Less important](#)

Troponin C is responsible for binding calcium to activate muscle contraction. Troponin C is released due to both skeletal and cardiac muscle damage resulting in poor specificity as a marker for myocardial necrosis.

Troponin T binds to tropomyosin, forming a troponin-tropomyosin complex. It is a specific marker for myocardial necrosis.

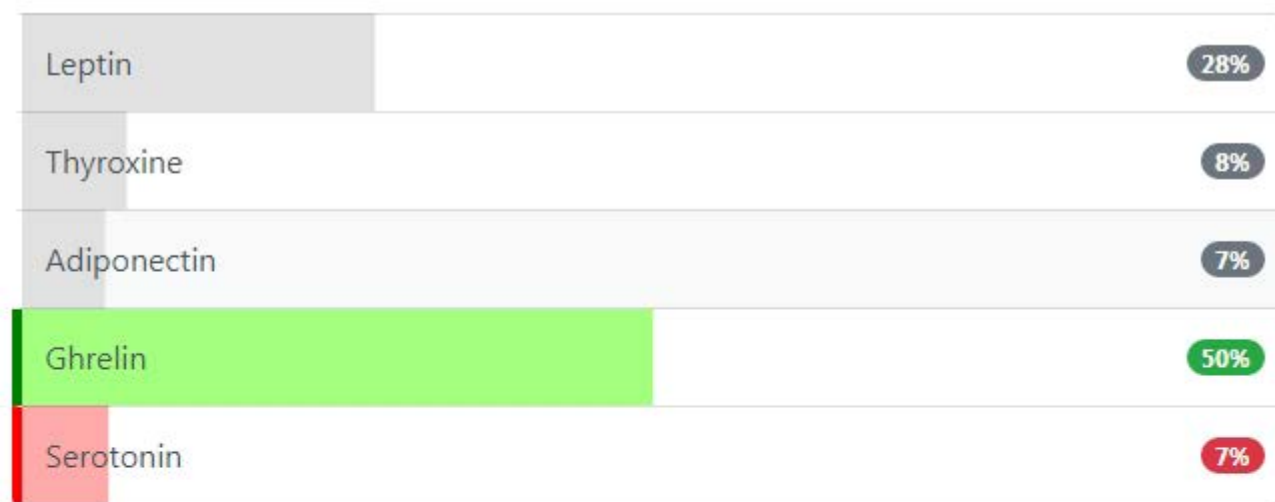
Troponin I binds to actin to hold the troponin-tropomyosin complex in place. It is a specific marker for myocardial necrosis.

Myosin is the thick component of muscle fibres. Actin slides along myosin to generate muscle contraction.

The sarcoplasmic reticulum regulates the calcium ion concentration in the cytoplasm of striated muscle cells.

A 25-year-old man who has been morbidly obese for the past five years is reviewed in the endocrinology clinic. In this patient, which one of the following hormones would increase appetite as levels increase?

- ☐ Leptin
- ☐ Thyroxine
- ☐ Adiponectin
- ☐ Ghrelin
- ☐ Serotonin



Obesity hormones

- **Leptin** Lowers appetite
- **Ghrelin** Gains appetite

Important for me Less important

Whilst thyroxine can increase appetite it does not fit with the clinical picture being described

The average weight loss of a patient following a new type of bariatric surgery is 18 kg. The standard deviation of weight loss is 3kg. Assuming the weight loss is normally distributed, what percentage of patients will loss between 9 and 27 kg?

☐ 97.4%

☐ 95%

☐ 95.4%

☐ 68.3%

☐ 99.7%



99.7% of values of a normally distributed variable lie within 3 standard deviations of the mean.

A 7-week old male baby is referred to the paediatric clinic by the GP. The mother is concerned that he has poor movement in his arms and legs and still unable to hold his head up. She is also concerned as she feels that he is not seeing as well as she thinks a baby this age should. They both immigrated to this country from Bangladesh 2 weeks ago and she has not seen any of the healthcare professionals yet. Her partner, the baby's father, is her first cousin. There is a family history of death in early childhood but she doesn't remember the details. On examination, there is minimal head control and poor power in all limbs. Fundoscopy reveals cherry red spots on the macula. There is no hepatomegaly or splenomegaly.

What is the most likely diagnosis?

- ☐ McArdle's disease
- ☐ Gaucher's disease
- ☐ Niemann-pick disease
- ☐ Tay-Sachs disease
- ☐ Fabry disease

McArdle's disease

15%

Gaucher's disease

13%

Niemann-pick disease

19%

Tay-Sachs disease

36%

Fabry disease

18%

Tay-Sachs disease typically presents with developmental delay and cherry red spot on the macula, without hepatomegaly or splenomegaly

Important for me Less important

Tay-Sachs disease is a type of lysosomal storage disease which typically presents with developmental delay and cherry red spot on the macula, without hepatomegaly or splenomegaly. This is in contrast to Niemann-pick disease which can also presents with cherry red spot on the macula but with hepatosplenomegaly.

McArdle's disease is a glycogen storage disease which presents with myalgia and myoglobinuria with exercise.

Gaucher's disease is a type of lysosomal storage disease which presents with massive splenomegaly.

Fabry's disease is a type of lysosomal storage disease which has features including angiokeratomas, peripheral neuropathy and renal failure.

You are reviewing the blood results for a patient who was started on atorvastatin 20mg on for primary prevention 3 months ago:

	Recent	3 months ago prior to starting treatment
Total cholesterol	4.2 mmol/l	6.3 mmol/l
HDL cholesterol	1.1 mmol/l	1.0 mmol/l
Non-HDL cholesterol	2.1 mmol/l	4.0 mmol/l
Triglyceride	1.2 mmol/l	1.3 mmol/l

Liver function tests are normal.

What is the most appropriate course of action?

- ☐ Reduce atorvastatin to 10mg on
- ☐ Make no changes to medication
- ☐ Increase atorvastatin to 40mg on
- ☐ Check creatine kinase
- ☐ Check compliance

Reduce atorvastatin to 10mg on

10%

Make no changes to medication

60%

Increase atorvastatin to 40mg on

12%

Check creatine kinase

8%

Check compliance

10%

NICE look for a 40% reduction in non-HDL cholesterol after 3 months. A 10% reduction in a non-HDL cholesterol of 4.0 would be 0.4 so a 40% reduction would take it down to $(4.0 - 1.6 = 2.4 \text{ mmol/l})$. This patients non-HDL cholesterol of 2.1 mmol/l is therefore acceptable.

A study measures a patient's serum cholesterol before and after a new lipid-lowering therapy has been given. What type of significance test should be used to analyse the data?

- ☐ Student's paired t-test
- ☐ Student's unpaired t-test
- ☐ Chi-squared test
- ☐ Pearson's test
- ☐ Spearman test

Student's paired t-test

61%

Student's unpaired t-test

10%

Chi-squared test

14%

Pearson's test

8%

Spearman test

7%

A 15-year-old girl presents with an urticarial rash, angioedema and wheezing. Her mother states that she has just come from her younger sister's party where she had been helping to blow up balloons. What is the most likely diagnosis?

- ☐ C1-esterase deficiency (hereditary angioedema)
- ☐ Allergic contact dermatitis
- ☐ Peanut allergy
- ☐ Latex allergy
- ☐ Irritant contact dermatitis

C1-esterase deficiency (hereditary angioedema)

12%

Allergic contact dermatitis

6%

Peanut allergy

5%

Latex allergy

74%

Irritant contact dermatitis

4%

Type I hypersensitivity reaction - anaphylaxis

Important for me Less important

This is a typical history of latex allergy. Adrenaline should be given immediately and usual anaphylaxis management followed

Dr Assem

A 28-year-old man is admitted to the Emergency Department with dyspnoea and fever. Two days ago he developed an itchy, vesicular rash after coming into contact with a child who had chickenpox. On examination his temperature is 38.6°C, respiratory rate 24 / min, pulse 120 / min and blood pressure 135/68 mmHg. Oxygen saturations are 95% on room air. Examination of chest reveals only occasional fine crackles bilaterally. What is the most important intervention?

- ☐ Elective intubation within the next 2 hours
- ☐ Prednisolone
- ☐ Varicella zoster immunoglobulin
- ☐ IV aciclovir
- ☐ Paracetamol



Varicella pneumonia is the most common and serious complication of chickenpox infection in adults. Auscultation of the chest is often unremarkable. Varicella zoster immunoglobulin is used for the prevention of varicella in at-risk groups (e.g. Immunocompromised, pregnant women), rather than for treatment

The nicotinic acetylcholine receptor is an example of a:

- ☐ Ligand-gated ion channel
- ☐ Tyrosine kinase receptor
- ☐ Guanylate cyclase receptor
- ☐ G protein-coupled receptor
- ☐ Intracellular receptor

Ligand-gated ion channel

51%

Tyrosine kinase receptor

7%

Guanylate cyclase receptor

12%

G protein-coupled receptor

25%

Intracellular receptor

5%

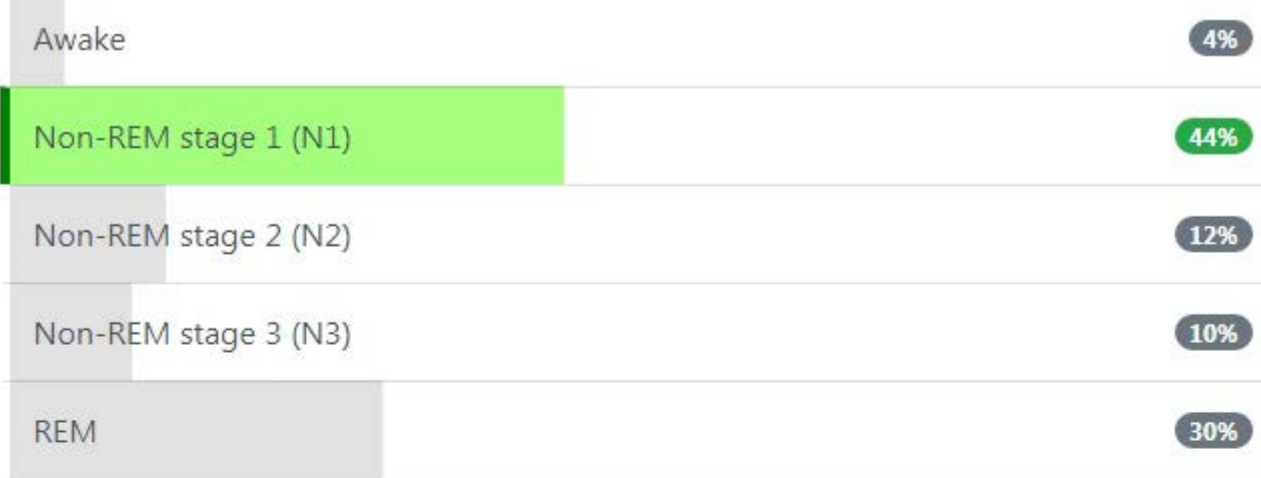
Nicotinic acetylcholine - ligand-gated ion channel receptor

Important for me Less important

A 22-year-old man presents with difficulties sleeping. He states that as he is falling to sleep he develops an unpleasant sensation and jerk which often causes him to awaken suddenly. They are occurring a few times a week and he is concerned they may be due to a serious underlying disorder.

What stage of sleep does this phenomenon occur?

- ☐ Awake
- ☐ Non-REM stage 1 (N1)
- ☐ Non-REM stage 2 (N2)
- ☐ Non-REM stage 3 (N3)
- ☐ REM



Non-REM stage 1 (N1) sleep is the lightest sleep which is associated with hypnagogic jerks

Important for me [Less important](#)

A hypnagogic jerk is a type of myoclonus. It causes an involuntary twitch which occurs when a person is beginning to fall asleep, often causing them to jump and awaken suddenly for a moment. They occur in non-REM stage 1 (N1) sleep - the lightest sleep stage. There is a wide range of potential causes, including anxiety, caffeine, stress and strenuous activities in the evening. However, most hypnagogic jerks occur as a normal variant.

REM sleep disorders are associated with lucid dreaming and the absence of the normal atonia during this stage of sleep. This can result in patients acting out their dreams and causing themselves and others physical harm.

A 43-year-old gentleman has returned back to the UK 2 weeks ago following a trip to Africa. He attends his GP complaining of a fever, chills and a bite on his left hand. On close inspection, you can see a 1x1.5cm dark black crust over the site.

What is the most likely underlying organism?

- ☐ *Rickettsial conorii*
- ☐ *Streptococcus pyogenes*
- ☐ *Borrelia burgdorferi*
- ☐ *Bartonella henselae*
- ☐ *Mycobacterium leprae*

<i>Rickettsial conorii</i>	38%
<i>Streptococcus pyogenes</i>	4%
<i>Borrelia burgdorferi</i>	31%
<i>Bartonella henselae</i>	17%
<i>Mycobacterium leprae</i>	11%

Rickettsial infections can occur on six continents, although the clinical presentation may vary between each of them. As a rule, they tend to present with a combination of rash, headaches, and either single or multiple eschars. The clue here is the presence of an eschar which should lead you to consider the diagnosis along with a history of recent foreign travel.

Borrelia burgdorferi and *Bartonella henselae* are the causative organisms of Lyme disease and cat-scratch fever. *Mycobacterium leprae* presents more with insensate patches and wasting as it progresses.

Which one of the following immunoglobulins is involved in the activation of B-cells?

☐ IgD

☐ IgM

☐ IgE

☐ IgG

☐ IgA

IgD

32%

IgM

25%

IgE

7%

IgG

27%

IgA

8%

IgD is involved in the activation of B-cells

Important for me Less important

A 23-year-old gentleman is referred to the respiratory clinic with a possible diagnosis of bronchiectasis. He has been suffering from recurrent chest infections his entire life and has also struggled to maintain a healthy weight. He has no smoking history and no notable family history. He has tried inhalers but these have had no noticeable effect. He is suspected of having cystic fibrosis and genetic tests are sent for analysis.

What is the normal function of the cystic fibrosis transmembrane regulator?

- ☐ Signalling molecule
- ☐ Water channel
- ☐ Potassium channel
- ☐ Chloride channel
- ☐ Sodium channel



The correct answer is chloride channel, specifically a cyclic-AMP regulated chloride channel. There are many different mutations which can cause cystic fibrosis but they all disrupt the same gene, the cystic fibrosis transmembrane conductance regulator gene. This is a chloride channel which when not functioning leads to increased viscosity of secretions, which leads to the pathology of cystic fibrosis.

A 67-year-old man with type 2 diabetes mellitus is receiving his annual diabetic check. He is feeling more fatigued than usual. He has not attended his previous three annual check-ups. His blood glucose control has been poor and he has not been compliant with his medications. Blood pressure is 170/90 mmHg. Urinalysis shows microalbuminuria. A blood test reveals his glomerular filtration rate (GFR) is 27mL/min per 1.73m².

If a renal biopsy was to be performed in this patient, what would be the expected findings?

- ☐ Nodular glomerulosclerosis and hyaline arteriosclerosis
- ☐ Apple-green birefringence under polarised light
- ☐ Enlarged and hypercellular glomeruli
- ☐ Crescent moon shaped glomeruli
- ☐ Wirelooping of capillaries in the glomeruli

Nodular glomerulosclerosis and hyaline arteriosclerosis

54%

Apple-green birefringence under polarised light

9%

Enlarged and hypercellular glomeruli

11%

Crescent moon shaped glomeruli

12%

Wirelooping of capillaries in the glomeruli

14%

Diabetic nephropathy histological findings- Kimmelstiel-Wilson lesions, nodular glomerulosclerosis

Important for me Less important

This patient has a poorly controlled T2DM with an underlying diabetic nephropathy. The histological findings are Kimmelstiel-Wilson lesions (nodular glomerulosclerosis) and hyaline arteriosclerosis. This is due to nonenzymatic glycosylation.

Apple-green birefringence under polarised light is seen in amyloidosis.

Enlarged and hypercellular glomeruli is seen in acute post-streptococcal glomerulonephritis.

Crescent moon shaped glomeruli is seen in rapidly progressive (crescentic) glomerulonephritis.

Wire looping of capillaries in the glomeruli is seen in diffuse proliferative glomerulonephritis (often due to SLE).

Dr Assem

A 25-year-old female patient presents to the emergency department with a 2-day history of bloody diarrhoea and abdominal pain. She was admitted under the medical team for intravenous rehydration therapy. The next day, she developed general oedema with sudden drop in her urine output. An urgent blood sample was sent with the results below.

Hb	9.0 g/dL
Urea	30.3 mmol/L
Creatinine	285µmol/L
Peripheral blood film	presence of schistocytes

What is the likely infection causing this clinical picture?

- ☐ Salmonella
- ☐ Shigella
- ☐ Campylobacter
- ☐ E.coli O157: H7
- ☐ Cholera

Dr Assem

Salmonella

5%

Shigella

13%

Campylobacter

10%

E.coli O157: H7

67%

Cholera

5%

E.coli O157: H7 is the strain causing haemolytic uraemic syndrome

Important for me [Less important](#)

The clinical picture suggests the haemolytic uraemic syndrome. The patient has a combination of bloody diarrhoea, acute renal failure with a high urea and haemolytic anaemia (as confirmed by the presence of schistocytes). E.coli O157: H7 is the strain causing haemolytic uraemic syndrome.

Salmonella, shigella and campylobacter can cause bloody diarrhoea but do not commonly cause haemolytic anaemia.

Cholera is not a cause of bloody diarrhoea.

Dr Assem

A 31-year-old woman is diagnosed with familial hypercholesterolaemia. Genetic testing shows that she is heterozygous for the condition. You discuss the possibility of screening her relatives. What is the chance her brother will also be affected?

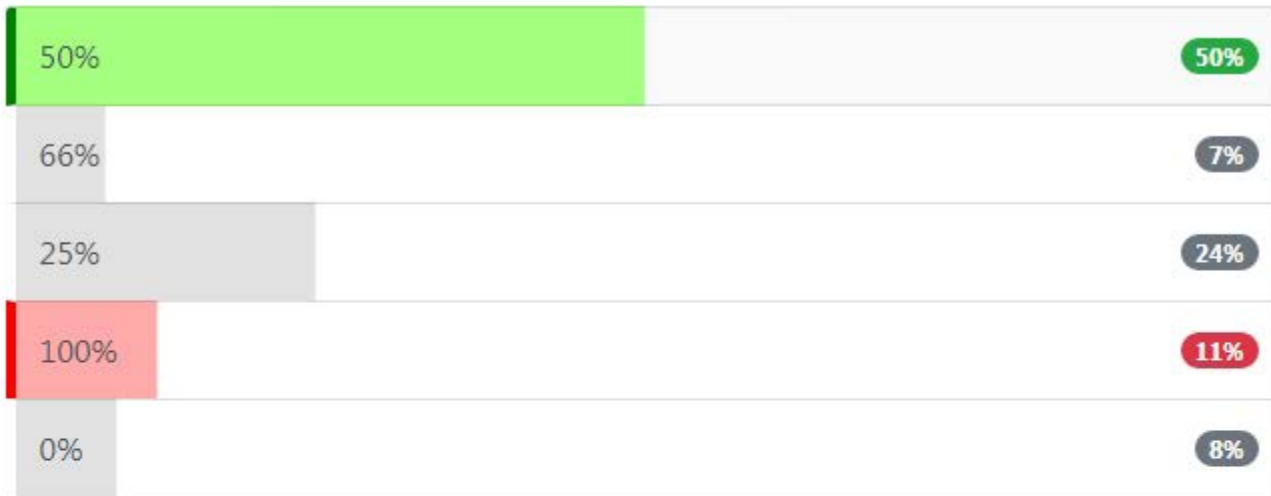
☐ 50%

☐ 66%

☐ 25%

☐ 100%

☐ 0%



Familial hypercholesterolaemia is an autosomal dominant condition

Important for me Less important

As familial hypercholesterolaemia is an autosomal dominant condition 50% of the first-degree relatives of heterozygotes will be affected. Please see the PLoS link for more details.

A 45-year-old female with poorly controlled rheumatoid arthritis attends a rheumatology appointment. She is started on a new medication called anakinra, an IL-1 receptor antagonist. Which cell is responsible for the production of IL-1?

- ☐ Neutrophils
- ☐ Basophils
- ☐ Eosinophils
- ☐ T cells
- ☐ Macrophages



The main source of IL-1 is macrophages

Important for me Less important

IL-1, an acute inflammatory cytokine, is mostly produced by innate immune cells. Within the innate immune system, macrophages are responsible for the production of cytokines, including IL-1. Basophils, Neutrophils and Eosinophils all produce proinflammatory cytokines but in lower volumes than macrophages. T cells don't produce IL-1.

A 12-year-old child comes into the GP clinic with her mother due to a sore throat and fever. On examination, the GP diagnoses the patient with viral tonsillitis and recommends paracetamol to alleviate the fever. Her mother is curious as to how her daughter will fight off the infection. Which cytokine is responsible for differentiating Th0 cells to Th1 cells?

☐ Tumour necrosis factor- α

☐ Interferon- γ

☐ IL-12

☐ IL-4

☐ IL-5

A 12-year-old child comes into the GP clinic with her mother due to a sore throat and fever. On examination, the GP diagnoses the patient with viral tonsillitis and recommends paracetamol to alleviate the fever. Her mother is curious as to how her daughter will fight off the infection. Which cytokine is responsible for differentiating Th0 cells to Th1 cells?

Tumour necrosis factor- α	15%
Interferon- γ	28%
IL-12	33%
IL-4	19%
IL-5	5%

IL-12 - main functions include: stimulates differentiation of naive T cells into Th1 cells

Important for me Less Important

IL-12 is responsible for the differentiation of Th0 cells to Th1 cells. Interferon- γ is produced by Th1 cells and is not responsible for the differentiation. IL-4 stimulates differentiation of Th0 cells to Th1 cells. IL-5 is secreted from Th2 cells. Tumour necrosis factor- α is a proinflammatory cytokine not involved in the adaptive immune response.

Dr Assem

Which one of the following statements regarding mitochondrial inheritance is true?

- ☐ Friedreich's ataxia is caused by defects in mitochondrial DNA
- ☐ There is a 50% chance that the female offspring of an affected male will inherit the disease
- ☐ Affected females cannot pass on the disease
- ☐ Most cases of spinocerebellar ataxia are caused by defects in mitochondrial DNA
- ☐ Poor genotype:phenotype correlation

Friedreich's ataxia is caused by defects in mitochondrial DNA

14%

There is a 50% chance that the female offspring of an affected male will inherit the disease

13%

Affected females cannot pass on the disease

7%

Most cases of spinocerebellar ataxia are caused by defects in mitochondrial DNA

19%

Poor genotype:phenotype correlation

47%

During cell division, at what stage do sister chromatids move to opposite ends of the cell?

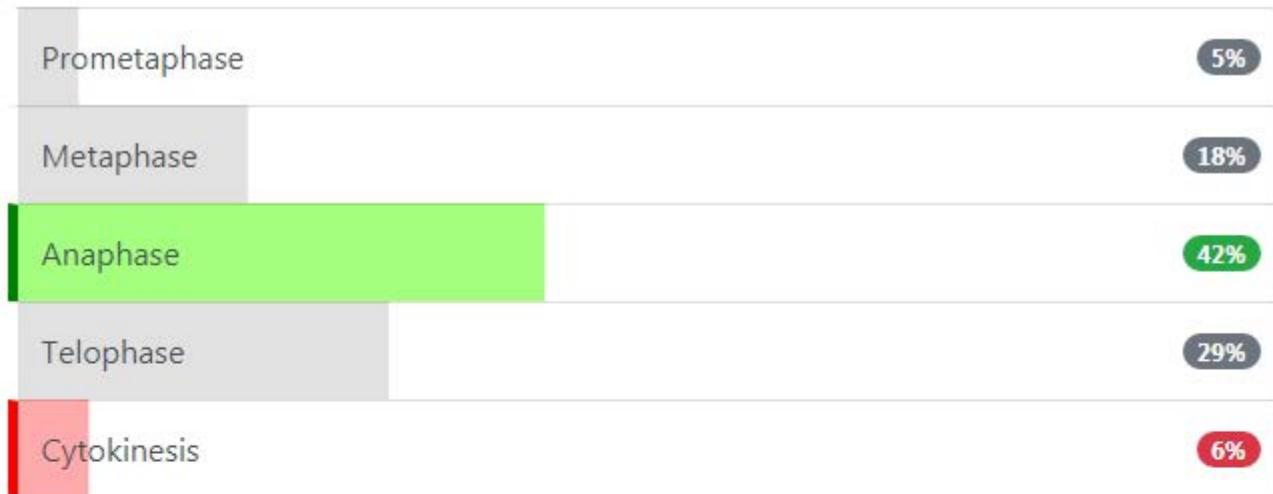
☐ Prometaphase

☐ Metaphase

☐ Anaphase

☐ Telophase

☐ Cytokinesis



During mitosis, sister chromatids move to opposite ends of the cell during anaphase

Important for me [Less important](#)

Anaphase is split into 2 parts:

- anaphase A: cohesins that bind sister chromatids together are cleaved, followed by shortening of the kinetochore microtubules which pulls the daughter chromosomes to opposite ends of the cell
- anaphase B: polar microtubules push against each other, causing the cell to elongate

In the Gell and Coombs classification of hypersensitivity reactions idiopathic thrombocytopenic purpura is an example of a:

- ☐ Type I reaction
- ☐ Type II reaction
- ☐ Type III reaction
- ☐ Type IV reaction
- ☐ Type V reaction

Type I reaction

4%

Type II reaction

53%

Type III reaction

28%

Type IV reaction

10%

Type V reaction

5%

Type II hypersensitivity reaction - ITP

Important for me

Less important

What is the main constituent of pulmonary surfactant?

- ☐ Apolipoprotein SP-B
- ☐ Phosphatidylglycerol
- ☐ Pulmonary elastase
- ☐ Apolipoprotein SP-A
- ☐ Dipalmitoyl phosphatidylcholine

Apolipoprotein SP-B

8%

Phosphatidylglycerol

18%

Pulmonary elastase

13%

Apolipoprotein SP-A

14%

Dipalmitoyl phosphatidylcholine

47%

Pulmonary surfactant - main constituent is **dipalmitoyl phosphatidylcholine (DPPC)**

Important for me Less important

Cystic fibrosis is due to a defect in the cystic fibrosis transmembrane conductance regulator (CFTR) gene. Which chromosome is this gene located on?

- ☐ Chromosome 3
- ☐ Chromosome 7
- ☐ Chromosome 11
- ☐ Chromosome 14
- ☐ Chromosome 15

Chromosome 3

6%

Chromosome 7

55%

Chromosome 11

19%

Chromosome 14

11%

Chromosome 15

9%

Which one of the following syndromes is associated with an increased risk of Crohn's disease?

- ☐ Turner's syndrome
- ☐ Down's syndrome
- ☐ Fragile X syndrome
- ☐ Patau syndrome
- ☐ Edward's syndrome

Turner's syndrome

39%

Down's syndrome

24%

Fragile X syndrome

16%

Patau syndrome

11%

Edward's syndrome

10%

The atrial natriuretic peptide receptor is an example of a:

- ☐ Ligand-gated ion channel
- ☒ Intracellular receptor
- ☐ Guanylate cyclase receptor
- ☐ G protein-coupled receptor
- ☐ Tyrosine kinase receptor

Ligand-gated ion channel

17%

Intracellular receptor

10%

Guanylate cyclase receptor

35%

G protein-coupled receptor

27%

Tyrosine kinase receptor

11%

Atrial natriuretic factor - guanylate cyclase receptor

Important for me

Less important

Which one of the following is true regarding bacterial exotoxins?

- ☐ They are mainly produced by Gram positive bacteria
- ☐ Cholera toxin inhibits cAMP release in intestinal cells
- ☐ Diphtheria toxin necrosis is limited to the pharynx, nasopharynx and tonsils
- ☐ *Staph. aureus* exotoxins are not known to cause gastroenteritis
- ☐ 'Lockjaw' seen in tetanus is secondary to blockade of the neuromuscular junction by Botulinus toxin

They are mainly produced by Gram positive bacteria

35%

Cholera toxin inhibits cAMP release in intestinal cells

17%

Diphtheria toxin necrosis is limited to the pharynx, nasopharynx and tonsils

10%

Staph. aureus exotoxins are not known to cause gastroenteritis

7%

'Lockjaw' seen in tetanus is secondary to blockade of the neuromuscular junction by Botulinus toxin

31%

A 22 year-old man is referred to clinic with refractory hypertension.

Potassium	2.7mmol/l
-----------	-----------

Other U&E, FBC, calcium and LFTs are normal. Which would be the most appropriate next investigation?

- ☐ CT abdomen
- ☐ MR angiography renal tract
- ☐ 24 hour urinary catecholamines
- ☐ USS abdomen
- ☐ Plasma renin and aldosterone levels

CT abdomen	8%
MR angiography renal tract	8%
24 hour urinary catecholamines	13%
USS abdomen	7%
Plasma renin and aldosterone levels	64%

The differential for hypertension with low potassium includes Conn's, Cushing's, renal artery stenosis and Liddle's. The first step in this case should be further simple investigations. Quantifying the renin and angiotensin levels will help to distinguish the cause here, before going on to more specialised tests.

Cushing's and Conn's would be associated with a high aldosterone and a low renin, renal artery stenosis would be associated with a high renin and aldosterone, Liddle's is associated with a low renin and aldosterone.

Which of the following conditions is inherited in an autosomal recessive fashion?

- ☐ Familial adenomatous polyposis
- ☐ Noonan syndrome
- ☐ Malignant hyperthermia
- ☐ Antithrombin III deficiency
- ☐ Congenital adrenal hyperplasia

Familial adenomatous polyposis

7%

Noonan syndrome

18%

Malignant hyperthermia

11%

Antithrombin III deficiency

21%

Congenital adrenal hyperplasia

43%

Autosomal recessive conditions are 'metabolic' - exceptions: inherited ataxias

Autosomal dominant conditions are 'structural' - exceptions: hyperlipidaemia type II, hypokalaemic periodic paralysis

Important for me Less important

The chance of a 45-year-old mother giving birth to a child with Down's syndrome is approximately:

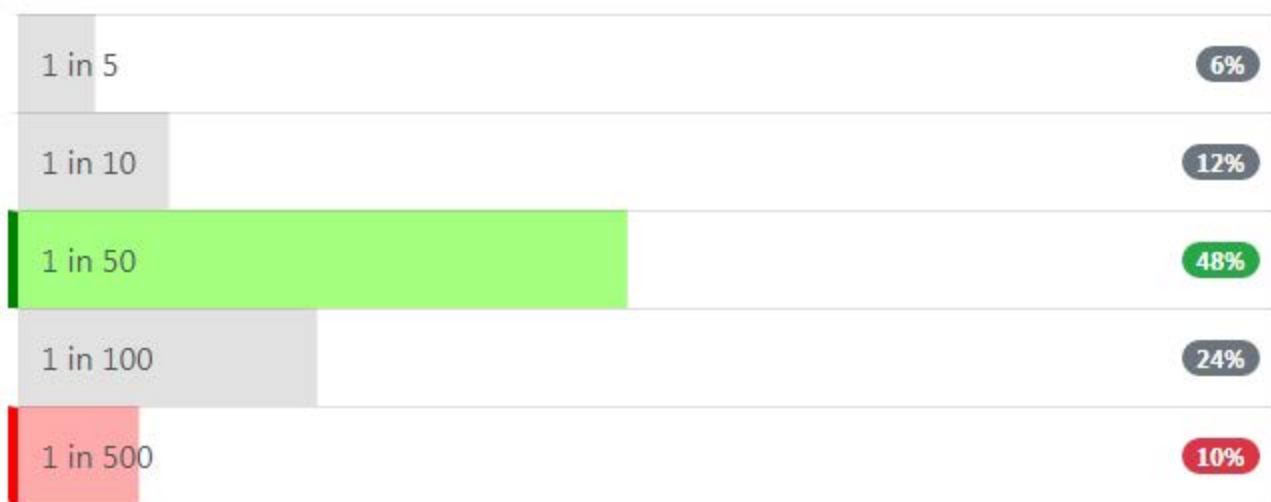
☐ 1 in 5

☐ 1 in 10

☐ 1 in 50

☐ 1 in 100

☐ 1 in 500



Down's syndrome risk - $1/1,000$ at 30 years then divide by 3 for every 5 years

Important for me Less important

What is the main action of atrial natriuretic peptide?

- ☐ Promotes renin excretion
- ☐ Reduces excretion of sodium and water
- ☐ Vasodilation
- ☐ Promotes aldosterone excretion
- ☐ Vasoconstriction

Promotes renin excretion

9%

Reduces excretion of sodium and water

12%

Vasodilation

56%

Promotes aldosterone excretion

10%

Vasoconstriction

13%

Atrial natriuretic peptide - powerful vasodilator

Important for me Less important

Which of the following is most likely to cause hypokalaemia associated with acidosis?

- ☐ Cushing's syndrome
- ☐ Vomiting
- ☐ Conn's syndrome
- ☐ Diuretics
- ☐ Acetazolamide

Cushing's syndrome

9%

Vomiting

15%

Conn's syndrome

15%

Diuretics

15%

Acetazolamide

46%

Acetazolamide causes hypokalaemia

Important for me Less important

What is the site of action of antidiuretic hormone?

- ☐ Descending loop of Henle
- ☐ Distal convoluted tubule
- ☒ Ascending loop of Henle
- ☐ Proximal convoluted tubule
- ☐ Collecting ducts

Descending loop of Henle

6%

Distal convoluted tubule

18%

Ascending loop of Henle

9%

Proximal convoluted tubule

9%

Collecting ducts

59%

Antidiuretic hormone (ADH) - site of action = collecting ducts

Important for me Less important

Which one of the following best describes the Hering-Breuer reflex?

- ☐ Lung distension causing slowing of the respiratory rate
- ☐ Raised hydrogen ion concentration in the ECF stimulating respiration
- ☐ Low pO_2 stimulating the carotid and aortic bodies
- ☐ Lung distension causing increase of the respiratory rate
- ☐ Decreased hydrogen ion concentration in the ECF stimulating respiration

Lung distension causing slowing of the respiratory rate

34%

Raised hydrogen ion concentration in the ECF stimulating respiration

21%

Low pO_2 stimulating the carotid and aortic bodies

17%

Lung distension causing increase of the respiratory rate

17%

Decreased hydrogen ion concentration in the ECF stimulating respiration

12%

Which of the following statements is true regarding the standard polymerase chain reaction (PCR)?

- ☐ Restriction endonuclease enzymes are applied to DNA fragments prior to electrophoresis
- ☐ PCR use is limited by its relatively low sensitivity
- ☐ A thermostable DNA polymerase is required
- ☐ PCR is currently limited to prenatal diagnosis and forensics
- ☐ A single DNA oligonucleotide primer is necessary

Restriction endonuclease enzymes are applied to DNA fragments prior to electrophoresis

18%

PCR use is limited by its relatively low sensitivity

5%

A thermostable DNA polymerase is required

51%

PCR is currently limited to prenatal diagnosis and forensics

6%

A single DNA oligonucleotide primer is necessary

20%

A 46-year-old lady presents to the Emergency Department with acute intermittent sharp pain in her right flank and haematuria. She has slight nausea, but feels otherwise fine in herself. She has a history of hyperparathyroidism, but has not experienced these symptoms before. She has a body mass index of 28kg/m^2 and reveals that her diet involves regular takeaways. On examination she appears restless and has right flank tenderness.

What substance is most likely to be causing the pain in this patient?

- ☐ Calcium oxalate
- ☐ Struvite
- ☐ Calcium phosphate
- ☐ Uric acid
- ☐ Cystine

Calcium oxalate	53%
Struvite	10%
Calcium phosphate	26%
Uric acid	8%
Cystine	4%

Renal stones are most commonly composed of calcium oxalate

Important for me Less important

This is a history of renal colic, caused by renal stones, with intermittent sharp flank pain causing restlessness in the patient. 85% of renal stones are composed of calcium oxalate, with hypercalciuria and hyperparathyroidism being risk factors, and so this is by far the most likely cause in this patient.

Struvite stones account for 2-20% of cases, but are associated with urease-producing bacteria and chronic infections, which makes it unlikely in this patient.

10% of renal stones are composed of calcium phosphate, with increased risk in renal tubular acidosis.

Uric acid stones are usually more commonly seen alongside malignancies and only account for 5-10% of cases.

1% of stones are made of cystine and these may cause multiple stones.

With the biggest risk factors in this patient appearing to be diet, obesity, and hyperparathyroidism, the most likely cause is calcium oxalate, usually the most common cause across all types of renal stones.

During a newborn physical examination, a paediatrician notes cleft palate, low-set ears and a holo-systolic murmur along the left lower sternal border. Blood tests show hypocalcaemia and chest x-ray reveals an absent thymic shadow and a 'boot-shaped' heart. Further investigations confirm a ventricular septal defect, right ventricular hypertrophy and an overriding aorta.

Which of the following congenital heart diseases is most likely present in this newborn?

- ☐ Total anomalous pulmonary venous return
- ☐ Transposition of great vessels
- ☐ Aortic coarctation
- ☐ Tetralogy of Fallot
- ☐ Tricuspid atresia

Total anomalous pulmonary venous return	2%
Transposition of great vessels	11%
Aortic coarctation	5%
Tetralogy of Fallot	76%
Tricuspid atresia	5%

Cardiac abnormalities of DiGeorge syndrome include truncus arteriosus and tetralogy of Fallot

Important for me [Less important](#)

This patient has a primary immunodeficiency disorder, DiGeorge syndrome, which is also known as 22q11.2 deletion syndrome. It is highly associated with Tetralogy of Fallot and truncus arteriosus.

'CATCH22' is a mnemonic used to describe some of the key features of this condition:

C - Cardiac abnormalities

A - Abnormal facies

T - Thymic aplasia

C - Cleft palate

H - Hypocalcaemia/ hypoparathyroidism

22 - Caused by chromosome 22 deletion

You are asked to review some arterial blood gases (ABGs) done on a patient who has recently been admitted to the Emergency Department. The ABGs shown below were taken on air:

pH	7.53
pCO ₂	5.1 kPa
pO ₂	13.9 kPa
Bicarbonate	34 mmol/l

Which one of the following is the most likely cause?

- ☐ Chronic obstructive pulmonary disease
- ☐ Renal tubular acidosis
- ☐ Mesenteric ischaemia
- ☐ Anxiety
- ☐ Vomiting

Chronic obstructive pulmonary disease

10%

Renal tubular acidosis

9%

Mesenteric ischaemia

7%

Anxiety

17%

Vomiting

58%

Vomiting / aspiration - metabolic alkalosis

Important for me Less important

The blood gases show a metabolic alkalosis

Dr Assem

Which one of the following is most commonly secreted by T-helper cells subset 2 (Th2 cells) ?

- ☐ Interleukin 2
- ☐ Tumour necrosis factor
- ☐ Interferon gamma
- ☐ Interleukin 4
- ☐ Interleukin 3

Interleukin 2

22%

Tumour necrosis factor

15%

Interferon gamma

16%

Interleukin 4

39%

Interleukin 3

7%

Fragile X is associated with each one of the following, except:

- ☐ Small, firm testes
- ☐ Mental retardation
- ☐ Hypotonia
- ☐ Short stature
- ☐ Large low set ears

Fragile X is associated with each one of the following, except:

Small, firm testes

41%

Mental retardation

8%

Hypotonia

14%

Short stature

18%

Large low set ears

20%

An 8-year-old is admitted with suspected appendicitis and has a laparoscopic appendicectomy. He is given 0.45 % sodium chloride post-operatively. When reviewed by the surgical team he has developed features of a headache, confusion, and disturbance to his gait.

Na ⁺	128 mmol/l
K ⁺	4.0 mmol/l
Urea	5 mmol/l
Creatinine	60µmol/l
Glucose	4.0mmol/l

Which of the following is the most likely diagnosis?

- ☐ Adverse reaction to patient controlled analgesia
- ☐ Hyperosmolar hyperglycaemic state
- ☐ Hyponatraemic encephalopathy
- ☐ Normal pressure hydrocephalus
- ☐ Central pontine myelinolysis

Adverse reaction to patient controlled analgesia

5%

Hyperosmolar hyperglycaemic state

4%

Hyponatraemic encephalopathy

57%

Normal pressure hydrocephalus

6%

Central pontine myelinolysis

28%

Avoidance of using hypotonic (0.45%) in paediatric patients - risk of hyponatraemic encephalopathy

Important for me Less important

In paediatric patients, there are at higher risk of hyponatraemic encephalopathy. This is most noted in those who receive hypotonic intravenous fluids such as 0.45% sodium chloride. There is a second reason for the hyponatraemia in this patient, a well documented cause of SIADH is trauma and stress. ADH secretion lowers serum sodium levels through opening aquaporin channels allowing water to move into the intravascular space.

Central pontine myelinolysis is a consequence of rapidly corrected hyponatraemia which is not the case here

Excessive use of patient controlled analgesia could result in a reduced conscious level and respiratory depression especially if opiates such as morphine were prescribed

Hyperosmolar hyperglycaemic state is a complication of diabetes mellitus and can result in reduced conscious level - however by analysing the blood test results the random glucose level is normal.

Gait disturbance is a feature of normal pressure hydrocephalus but in association with dementia and urinary incontinence

A study looks at the use of bisphosphonates in controlling the pain associated with bone metastases. One hundred and twenty patients (120) are enrolled in the study, 40 of whom are given conventional treatment with NSAIDs and radiotherapy. Of the 80 patients who were given bisphosphonates, 40 received significant pain relief.

What is the odds of a patient with bone metastases receiving significant pain relief from bisphosphonates?

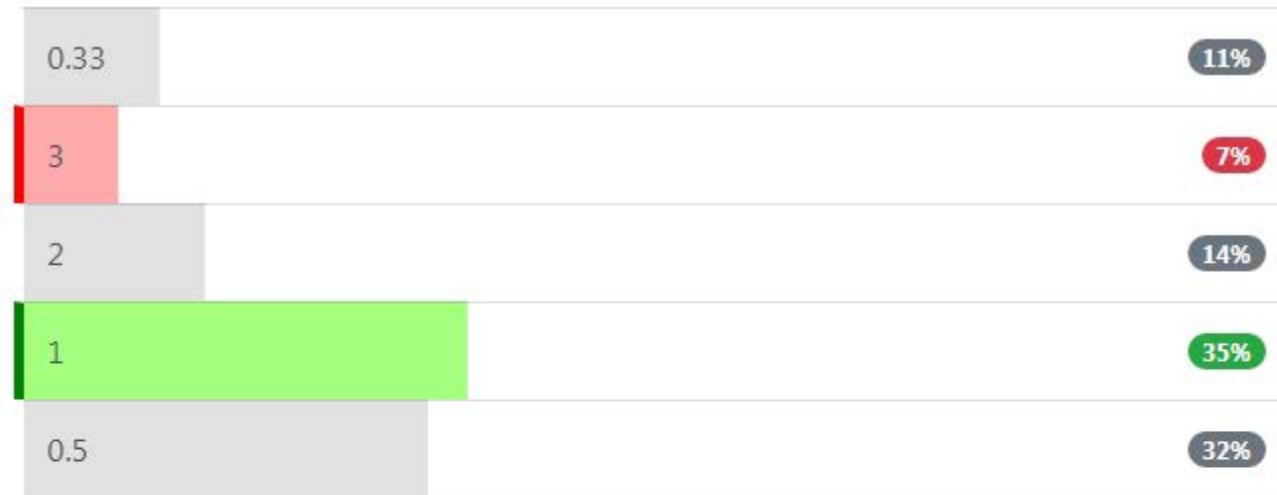
☐ 0.33

☐ 3

☐ 2

☐ 1

☐ 0.5



The question is limited to the 80 patients who've been given bisphosphonates. Odds are a ratio of the number of people who incur a particular outcome to the number of people who do not incur the outcome.

40 of the 80 patients received significant pain relief

It can therefore be inferred that 40 of the 80 patients did not receive significant pain relief.

Therefore the odds are $40 / 40 = 1$

Where are G protein-coupled receptors located?

- ☐ Nucleus
- ☐ Golgi apparatus
- ☐ Ribosome
- ☐ Cell membrane
- ☐ Mitochondria



G protein-coupled receptors span the cell membrane

Which of the following statements is true regarding the p53 gene?

- ☐ It is an oncogene
- ☐ Mutation results in a gain of function
- ☐ 50% of families with a strong history of breast cancer have a p53 mutation
- ☐ Li-Fraumeni syndrome predisposes to the development of sarcomas
- ☐ It is located on chromosome 13

It is an oncogene

19%

Mutation results in a gain of function

8%

50% of families with a strong history of breast cancer have a p53 mutation

13%

Li-Fraumeni syndrome predisposes to the development of sarcomas

51%

It is located on chromosome 13

9%

Dr Assem

A 17-year-old male is diagnosed with alpha-thalassaemia. What chromosome is the alpha-globulin genes located on?

- ☐ Chromosome 4
- ☐ Chromosome 8
- ☐ Chromosome 12
- ☐ Chromosome 16
- ☐ Chromosome 20

Chromosome 4

22%

Chromosome 8

19%

Chromosome 12

17%

Chromosome 16

36%

Chromosome 20

7%

Dr Assem

Aldosterone is secreted by the:

- ☐ Juxtaglomerular apparatus
- ☐ Zona glomerulosa
- ☐ Posterior pituitary
- ☐ Zona reticularis
- ☐ Zona fasciculata

Juxtaglomerular apparatus

11%

Zona glomerulosa

59%

Posterior pituitary

4%

Zona reticularis

12%

Zona fasciculata

13%

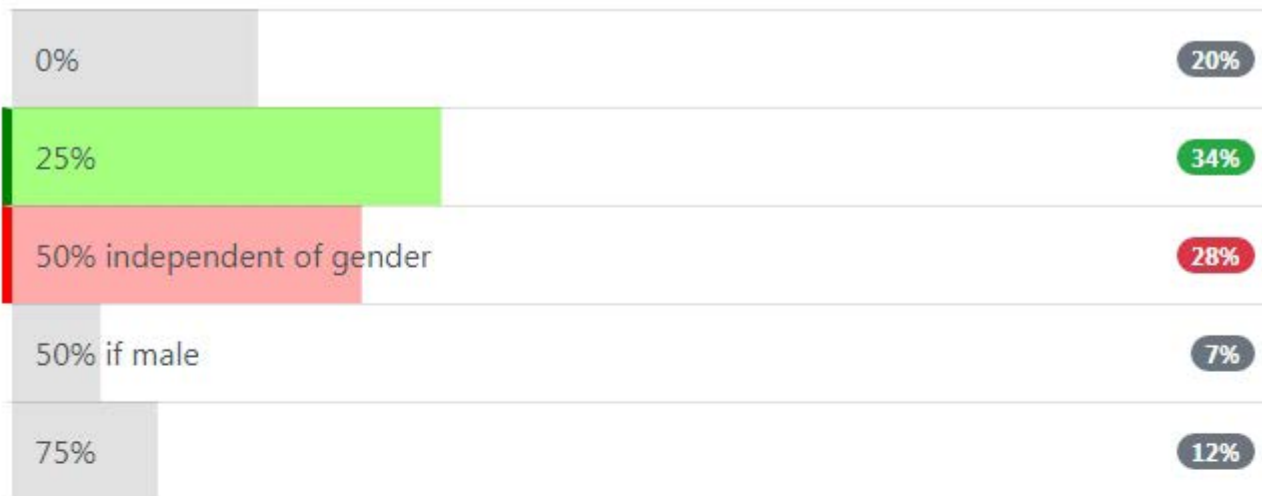
Adrenal cortex mnemonic: GFR - ACD

Important for me

Less important

You are discussing conception with two parents who both have achondroplasia. They ask you what the chances are that a child of theirs would be of normal height. What is the correct response?

- ☐ 0%
- ☐ 25%
- ☐ 50% independent of gender
- ☐ 50% if male
- ☐ 75%



Many questions relating to autosomal dominant conditions are based around one of the parents being affected. With achondroplasia both parents are often affected which can make the interpretation slightly trickier.

As an autosomal dominant condition, two affected parents can expect:

- 1 in 4 chance of an unaffected child
- 1 in 2 chance of an affected heterozygous child
- 1 in 4 chance of an affected homozygous child. With achondroplasia children unfortunately don't live past the first few months of life

The answer of having a child of normal height is therefore 1 in 4 or 25%.

Which one of the following is only secreted by the adrenal medulla?

- ☐ Noradrenaline
- ☐ Aldosterone
- ☐ Metadrenaline
- ☐ Cortisol
- ☐ Adrenaline

Noradrenaline

22%

Aldosterone

14%

Metadrenaline

10%

Cortisol

14%

Adrenaline

39%

A nurse who is known to have an allergy to latex develops a widespread urticarial rash and facial oedema shortly after eating lunch. Which food is she most likely to have consumed?

☐ Peanut

☐ Apple

☐ Grapes

☐ Pear

☐ Banana

Peanut

38%

Apple

9%

Grapes

9%

Pear

8%

Banana

37%

Which one of the following statements regarding leptin is **incorrect**?

- ☐ Is produced mainly by the hypothalamus
- ☐ Stimulates the release of melanocyte-stimulating hormone
- ☐ Obese patients have higher leptin levels
- ☐ Plays a key role in the regulation of body weight
- ☐ High levels decrease appetite

Is produced mainly by the hypothalamus

31%

Stimulates the release of melanocyte-stimulating hormone

12%

Obese patients have higher leptin levels

26%

Plays a key role in the regulation of body weight

8%

High levels decrease appetite

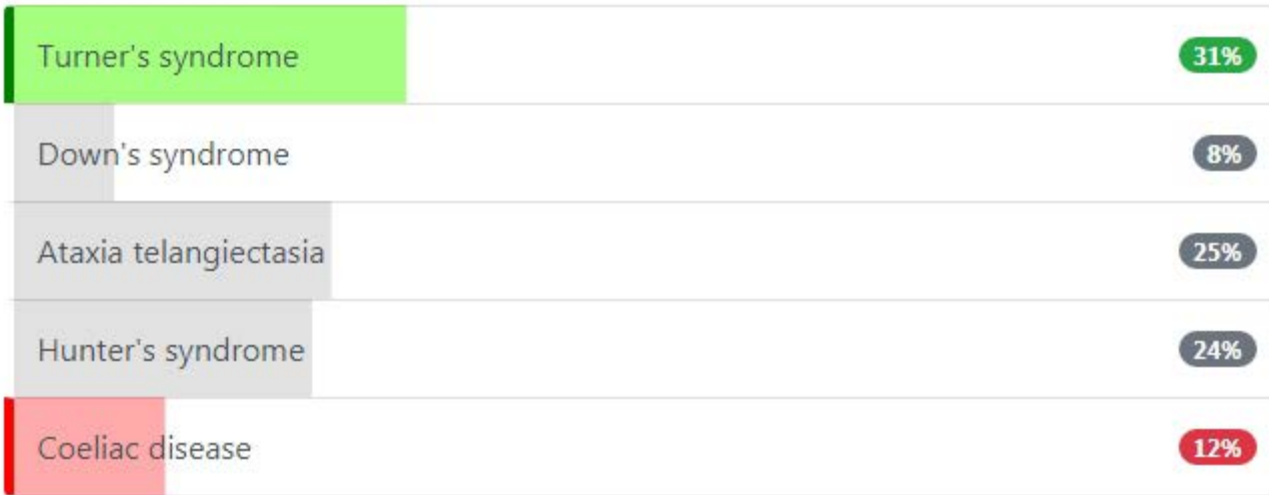
23%

Leptin is secreted by adipose tissue

Important for me Less important

A 14-year-old girl presents with a swollen left knee. Her parents state she suffers from haemophilia and has been treated for a right-sided haemarthrosis previously. What other condition is she most likely to have?

- ☐ Turner's syndrome
- ☐ Down's syndrome
- ☐ Ataxia telangiectasia
- ☐ Hunter's syndrome
- ☐ Coeliac disease

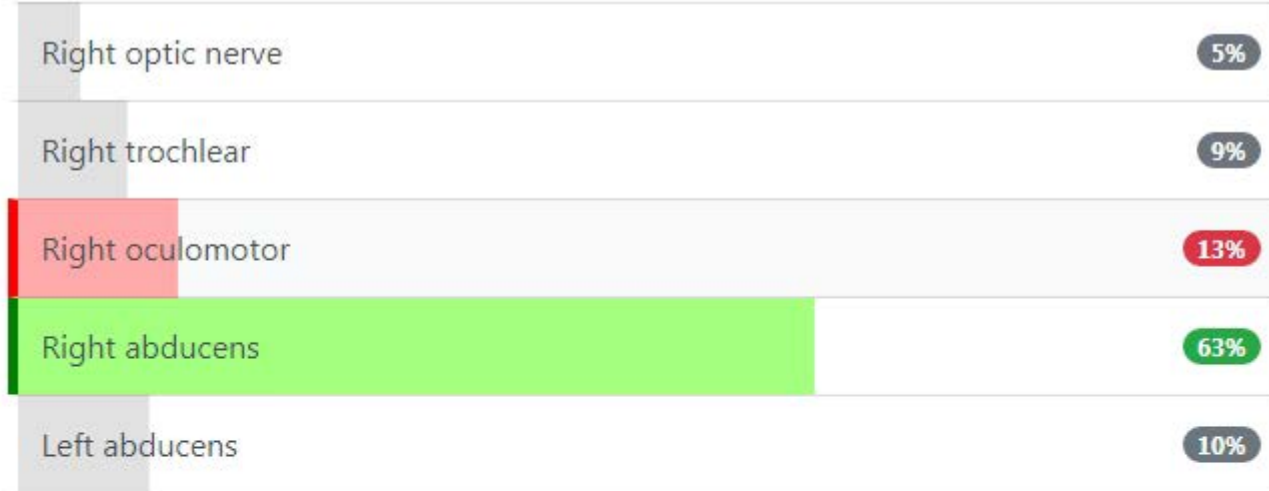


Haemophilia is a X-linked recessive disorder and would hence be expected only to occur in males. As patients with Turner's syndrome only have one X chromosome however, they may develop X-linked recessive conditions

A 39-year-old male with a history of type 1 diabetes mellitus presents to his general practice with diplopia. It exacerbates when looking right and improved upon covering the right eye.

What nerve is likely to be responsible?





As the horizontal gaze to the right is where the diplopia is worst and is improved on covering the right eye then the right abducens is affected as this controls the right lateral rectus and thus rightward gaze.

The trochlear nerve would lead to nystagmus on looking down and out.

The optic nerve would not lead to diplopia.

Which of the following features is not associated with patent ductus arteriosus?

- ☐ Continuous 'machinery' murmur
- ☐ Bisferiens pulse
- ☐ Heaving apex beat
- ☐ Wide pulse pressure
- ☐ Left subclavicular thrill

Continuous 'machinery' murmur

7%

Bisferiens pulse

53%

Heaving apex beat

18%

Wide pulse pressure

15%

Left subclavicular thrill

7%

PDA is associated with a collapsing pulse

Dr Assem

In the Gell and Coombs classification of hypersensitivity reactions scabies is an example of a:

- ☐ Type I reaction
- ☐ Type II reaction
- ☐ Type III reaction
- ☐ Type IV reaction
- ☐ Type V reaction



Type IV hypersensitivity reaction - scabies

Important for me Less important

Scabies produces a delayed type IV hypersensitivity reaction approximately one month after infestation. This produces the characteristic intense itching

A study is designed to compare the calcium levels of males and females who have Crohn's disease. The investigators aim to discover whether there is a difference between the average calcium level in males compared to females. From previous studies it is known that the calcium levels are normally distributed. Which one of the following statistical tests is it most appropriate to use?

- ☐ Pearson's test
- ☐ Mann-Whitney test
- ☐ Chi-squared test
- ☐ Student's unpaired t-test
- ☐ Student's paired t-test

Pearson's test

10%

Mann-Whitney test

8%

Chi-squared test

15%

Student's unpaired t-test

39%

Student's paired t-test

28%

As the data is parametric and compares two independent sample from the same population an unpaired t-test is the most appropriate test to use

When establishing a screening programme, which one of the following is not a key criteria as defined by Wilson and Junger?

- ☐ There should be a recognised latent or early symptomatic stage
- ☐ The condition should be an important public health problem
- ☐ The test or examination should be acceptable to the population
- ☐ There should be agreed policy on whom to treat as patients
- ☐ The condition should be potentially curable

When establishing a screening programme, which one of the following is not a key criteria as defined by Wilson and Junger?

There should be a recognised latent or early symptomatic stage

20%

The condition should be an important public health problem

9%

The test or examination should be acceptable to the population

10%

There should be agreed policy on whom to treat as patients

21%

The condition should be potentially curable

39%

A 59-year-old male patient presents to the gastroenterology clinic with a 6-months history of weight loss, frequent loose and greasy stool. He has a long-standing history of heavy alcohol use and recurrent hospital admissions for acute pancreatitis. On examination, the patient looks malnourished. There is mild tenderness elicited on palpation of the epigastric region.

Which hormone will likely be relevant in the investigation of his symptoms?

☐ Gastrin

☐ Secretin

☐ Incretin

☐ Insulin

☐ Glucagon

Gastrin	17%
Secretin	43%
Incretin	16%
Insulin	15%
Glucagon	9%

Secretin increases secretion of bicarbonate-rich fluid from pancreas and hepatic duct cells

Important for me Less important

This patient has symptoms suggestive of pancreatic insufficiency likely secondary to chronic pancreatitis, given the weight loss and steatorrhoea as well as the history of alcohol misuse. Secretin increases the secretion of bicarbonate-rich fluid from pancreas and hepatic duct cells and it can be used as a test for pancreatic function (secretin stimulation test).

Gastrin increases HCL production.

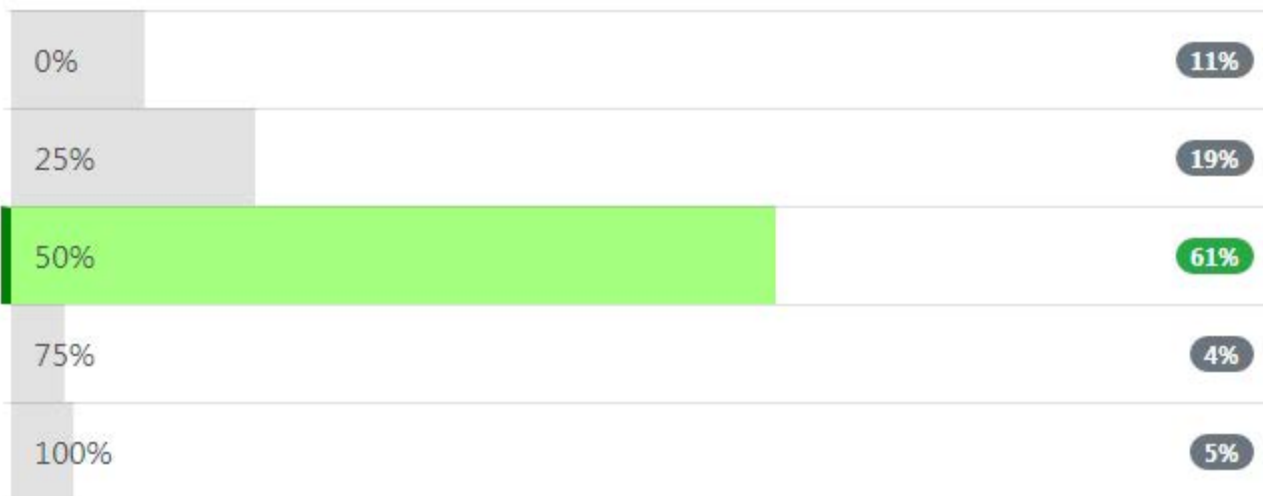
Incretin is released following food intake and stimulates insulin secretion.

Insulin and glucagon are pancreatic hormones but they are not the main hormones that stimulate the secretion of bicarbonate-rich fluid from pancreas and hepatic duct cells. They are mainly involved in glucose regulation.

A 45-year-old man attends the GP for a health check. His cholesterol is found to be raised. He has a strong family history of high cholesterol. Genetic testing shows he is heterozygous for the affected allele.

If this man has a child with a woman who is not a carrier of the affected allele, what is the likelihood that the child will have the condition?

- ☐ 0%
- ☐ 25%
- ☐ 50%
- ☐ 75%
- ☐ 100%



Familial hypercholesterolaemia is an autosomal dominant condition

Important for me Less important

This question is testing your knowledge about inheritance. You should recall that familial hypercholesterolaemia is an autosomal dominant condition. A child born to this couple is 50% likely to have the condition. Drawing the genotypes of each parent is often helpful. This is often done using a Punnett square.

0% - this is not the correct answer. There will always be a chance of an affected child in an autosomal dominant condition. Drawing a Punnett square will show this.

25% - this is not the correct answer. Drawing a Punnett square can be helpful in this situation and will show that the likelihood of having an affected child is actually 50%.

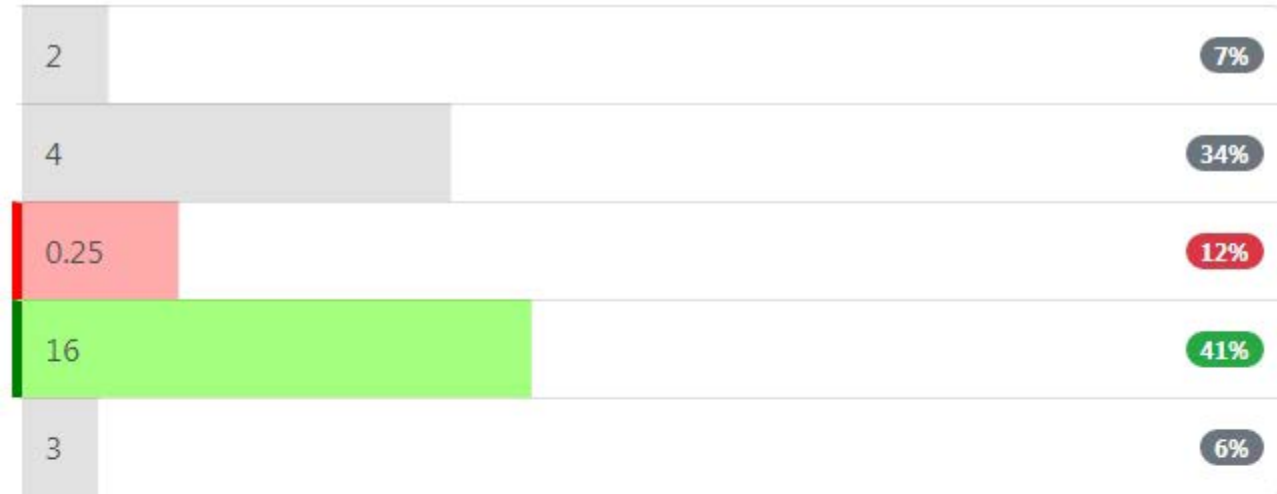
50% - this is the correct answer. There is a 50% chance this child will be affected by the condition.

75% - this is not the correct answer. Drawing a Punnett square can be helpful in this situation and will show that the likelihood of having an affected child is actually 50%.

100% - this is not the correct answer. There will only be a 100% chance of a child having an autosomal condition if both partners are homozygous for the affected alleles.

A small study is designed to look at the link between drinking alcohol and liver cirrhosis. One hundred patients with liver cirrhosis were questioned and it was found that 80 of them drank excessive alcohol. As a control, one hundred patients without liver cirrhosis were questioned and only 20 of these patients drank excessively. What is the odds ratio of developing liver cirrhosis for people who drink excessively compared to those who do not?

- ☐ 2
- ☐ 4
- ☐ 0.25
- ☐ 16
- ☐ 3



Odds - remember a ratio of the number of people who incur a particular outcome to the number of people who do not incur the outcome

NOT a ratio of the number of people who incur a particular outcome to the total number of people

Important for me Less important

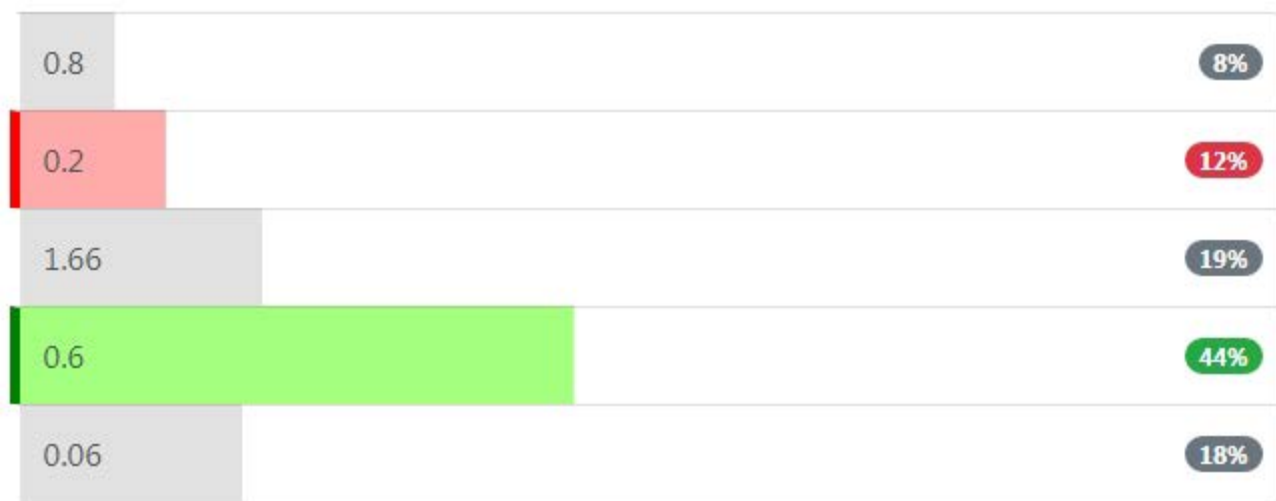
The odds of a patient with liver cirrhosis having a history of excessive drinking is $80/20 = 4$.

The odds of a patient without liver cirrhosis having a history of excessive drinking is $20/80 = 0.25$.

Therefore the odds ratio = $4 / 0.25 = 16$

A new drug designed to prevent exacerbations of genital herpes undergoes clinical trials. One hundred patients are given the new drug. During a three month period 10 of the patients have an episode of genital herpes. In the control group there are 300 patients who are given a placebo. In this group 50 people have an exacerbation during the same time period. What is the relative risk of having an exacerbation of genital herpes whilst taking the new drug?

- ☐ 0.8
- ☐ 0.2
- ☐ 1.66
- ☐ 0.6
- ☐ 0.06



Experimental event rate, $EER = 10 / 100 = 0.10$

Control event rate, $CER = 50 / 300 = 0.166$

Therefore the relative risk = $EER / CER = 0.1 / 0.166 = 0.6$

Which of the following secondary causes of hyperlipidaemia result in predominantly hypercholesterolaemia, as opposed to hypertriglyceridaemia?

- ☐ Diabetes mellitus
- ☐ Bendrofluazide
- ☐ Nephrotic syndrome
- ☐ Alcohol
- ☐ Obesity

Diabetes mellitus

11%

Bendrofluazide

11%

Nephrotic syndrome

55%

Alcohol

9%

Obesity

14%

Hypercholesterolaemia rather than hypertriglyceridaemia: nephrotic syndrome, cholestasis, hypothyroidism

Important for me Less important

A 25-year-old woman presents with a symmetrical arthropathy affecting her hands. On examination she has synovitis of the 2nd and 3rd metacarpophalangeal joints. What type of HLA allele is most associated with this condition?

☐ HLA DR3

☐ HLA A3

☐ HLA DR4

☐ HLA DR2

☐ HLA B27

HLA DR3

15%

HLA A3

4%

HLA DR4

57%

HLA DR2

9%

HLA B27

15%

Rheumatoid arthritis - HLA DR4

Important for me Less important

This patient has rheumatoid arthritis.

Which one of the following is the most common genetic cause of Prader-Willi syndrome?

- ☐ Microdeletion of the paternal 15q11-13
- ☐ Maternal uniparental disomy of chromosome 15
- ☐ Paternal uniparental disomy of chromosome 15
- ☐ Microdeletion of the maternal 15q11-13
- ☐ Trisomy 18

Which one of the following is the most common genetic cause of Prader-Willi syndrome?

Microdeletion of the paternal 15q11-13

38%

Maternal uniparental disomy of chromosome 15

12%

Paternal uniparental disomy of chromosome 15

19%

Microdeletion of the maternal 15q11-13

22%

Trisomy 18

9%

Deletion of chromosome 15

- **P**raeder-Willi - **p**aternal
- Ang**e**l**m**an syndrome - **m**aternal

Important for me Less important

Which of the following statements is true regarding autosomal dominant inheritance?

- ☐ Individuals who are symptomatic of the disease always have parents who are symptomatic of the disease
- ☐ Only heterozygotes manifest disease
- ☐ 50% of children will be carriers
- ☐ Responsible for the majority of enzyme deficiency disorders
- ☐ The risk remains the same for each successive pregnancy

Individuals who are symptomatic of the disease always have parents who are symptomatic of the disease

27%

Only heterozygotes manifest disease

6%

50% of children will be carriers

18%

Responsible for the majority of enzyme deficiency disorders

6%

The risk remains the same for each successive pregnancy

43%

Due to non-penetrance affected individuals do not always have affected parents

A 32-year-old female patient presents to the GP with a 2-day history of abdominal pain and bloody diarrhoea. She reports that she has been completely well until one week ago when she started having a headache and general tiredness. On further questioning, she admitted to eating at a dodgy takeaway 3 days before the start of the symptoms.

What is the most likely diagnosis?

- ☐ Diverticulitis
- ☐ E. coli
- ☐ Cholera
- ☐ Giardiasis
- ☐ Campylobacter



Campylobacter infection is characterised by a prodrome, abdominal pain and bloody diarrhoea

Important for me Less important

Campylobacter infection is characterised by a prodrome, abdominal pain and bloody diarrhoea.

Diverticulitis can cause bloody stool but the history here suggests an infectious cause.

Most strains of E. coli, in general, do not cause bloody diarrhoea.

Cholera does not cause bloody diarrhoea.

Giardiasis has a longer incubation period and does not cause bloody diarrhoea.

Which one of the following congenital infections is most characteristically associated with sensorineural deafness?

☐ *Toxoplasma gondii*

☐ Parvovirus B19

☐ Rubella

☐ *Treponema pallidum*

☐ Group B streptococcus

Toxoplasma gondii

12%

Parvovirus B19

8%

Rubella

69%

Treponema pallidum

7%

Group B streptococcus

4%

Congenital rubella

- sensorineural deafness
- congenital cataracts

Important for me Less important

Which one of the following statements regarding the standard error of the mean is correct?

- ☐ Is the square root of standard deviation
- ☐ It is independent of sample size
- ☐ Is a measure of correlation between two variables
- ☐ Confidence intervals cannot be applied to the standard error of the mean
- ☐ Gets smaller as the sample size increases

Is the square root of standard deviation

19%

It is independent of sample size

9%

Is a measure of correlation between two variables

11%

Confidence intervals cannot be applied to the standard error of the mean

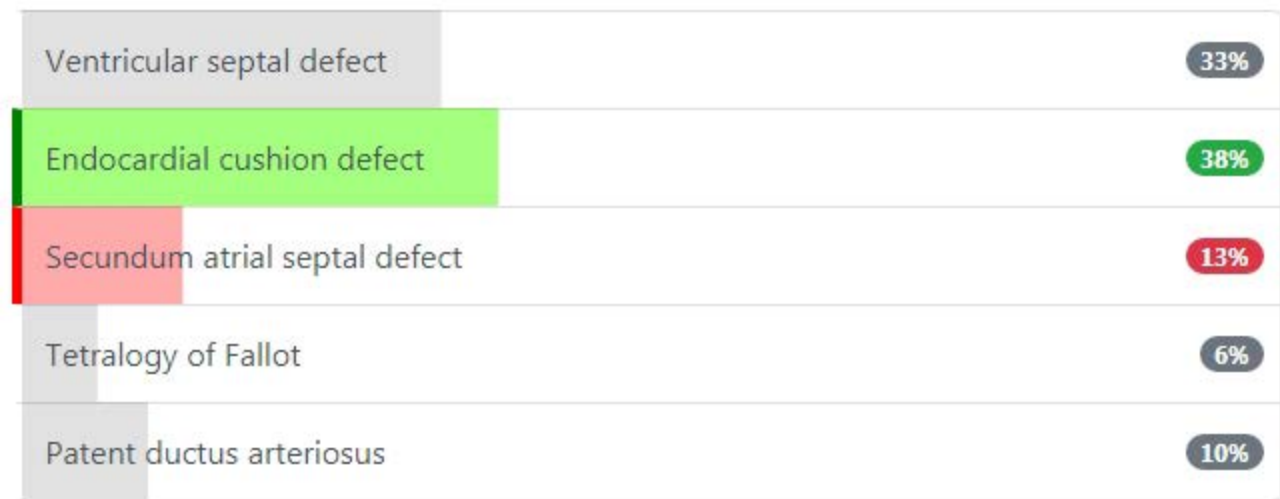
8%

Gets smaller as the sample size increases

54%

What is the most common cardiac defect seen in patients with Down's syndrome?

- ☐ Ventricular septal defect
- ☐ Endocardial cushion defect
- ☐ Secundum atrial septal defect
- ☐ Tetralogy of Fallot
- ☐ Patent ductus arteriosus



Endocardial cushion defects account for about 40% of congenital heart disease seen in patients with Down's syndrome

A 75-year-old female presents with weakness of her left hand. On examination, wasting of the hypothenar eminence is seen and there is weakness of finger abduction. Thumb adduction is also weak. Where is the lesion most likely to be?

- ☐ C7
- ☐ Median nerve
- ☐ Radial nerve
- ☐ Anterior interosseous nerve
- ☐ Ulnar nerve

A 75-year-old female presents with weakness of her left hand. On examination, wasting of the hypothenar eminence is seen and there is weakness of finger abduction. Thumb adduction is also weak. Where is the lesion most likely to be?



A study is performed looking at the chance of stroke in high-risk patients taking a new oral antithrombotic drug compared to warfarin. The following results are obtained:

	Total number of patients	Number who had a stroke within a 3 year period
New drug	200	10
Warfarin	600	12

What is the relative risk of having a stroke within a 3 year period for patients taking the new drug compared to warfarin?

☐ 3.33

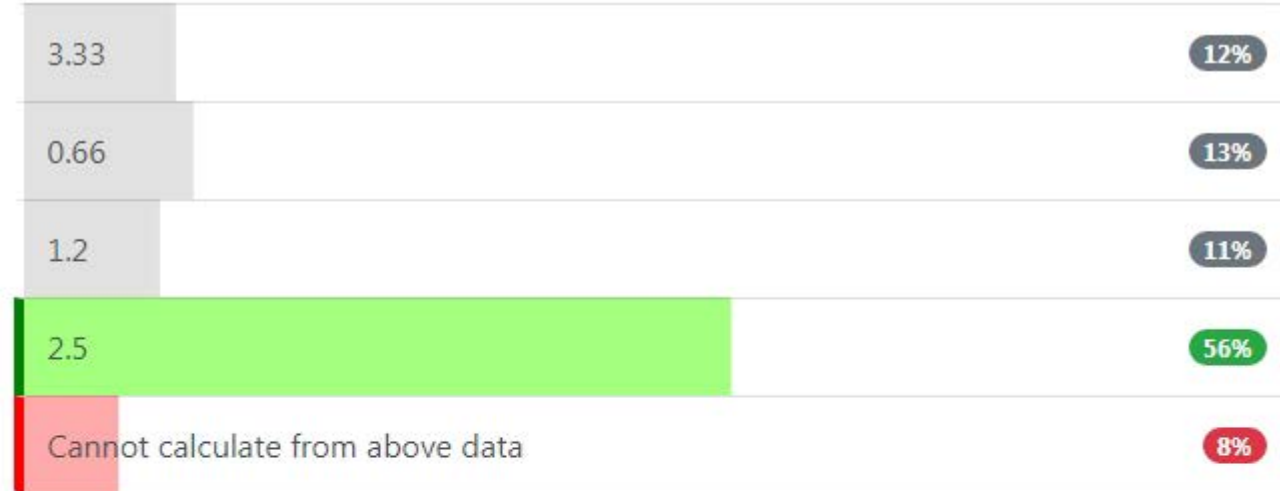
☐ 0.66

☐ 1.2

☐ 2.5

☐ Cannot calculate from above data

Dr Assem



Relative risk = EER / CER

Important for me Less important

Experimental event rate, $EER = 10 / 200 = 0.05$

Control event rate, $CER = 12 / 600 = 0.02$

Therefore the relative risk = $EER / CER = 0.05 / 0.02 = 2.5$

Dr Assem

A 70-year-old patient is brought to the emergency department. She has a GCS of 11. Her relatives tell you that she has been drinking large amounts of water in order to remain well hydrated during the hot weather. You find that she has a sodium level of 108 mmol/l. Her most recent sodium was 131 mmol/l when last checked 3 weeks ago. What is the underlying pathology by which acute hyponatraemia is causing her reduced GCS?

- ☐ Central pontine myelinolysis
- ☐ Concurrent hypoglycaemia
- ☐ Intracranial haemorrhage
- ☐ Cerebral oedema
- ☐ Cerebral vasospasm

Central pontine myelinolysis

25%

Concurrent hypoglycaemia

4%

Intracranial haemorrhage

5%

Cerebral oedema

62%

Cerebral vasospasm

5%

Acute severe hyponatraemia can cause cerebral oedema

Important for me Less important

The correct answer is cerebral oedema. The patient has acute hyponatraemia, most likely as a result of water intoxication in this scenario. Acute hyponatraemia causes cerebral oedema by reducing plasma osmolality, which causes water to move out of the plasma into the brain cells down the osmotic gradient. Cerebral oedema causes drowsiness and seizures.

Central pontine myelinolysis can occur if hyponatraemia is corrected too rapidly. The other mechanisms are not classically involved in hyponatraemia.

Effects of hyponatraemia on the brain

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4470176/>

Dr Assem

A 61-year-old man complains of a four month history of neck and arm pain. The pain is described as being like 'electric shocks' and is worse when he turns his head. There is no history of trauma and no other obvious trigger. He is otherwise fit and well and takes no other medication. On examination he has decreased sensation on the dorsal aspect of the thumb and index finger. What is the most likely underlying diagnosis?

☐ C4 radiculopathy

☐ C5 radiculopathy

☐ C6 radiculopathy

☐ C7 radiculopathy

☐ T1 radiculopathy

C4 radiculopathy

8%

C5 radiculopathy

17%

C6 radiculopathy

49%

C7 radiculopathy

18%

T1 radiculopathy

9%

A 3-year-old boy is investigated for lethargy. Examination is unremarkable with a blood pressure of 90/46 mmHg (normal for his age). Blood tests reveal:

Na ⁺	140 mmol/l
K ⁺	2.6 mmol/l
Bicarbonate	33 mmol/l
Urea	4.2 mmol/l
Creatinine	91 µmol/l

Which one of the following conditions is most likely to be responsible?

- ☐ Cushing's syndrome
- ☐ Conn's syndrome
- ☐ 11-beta hydroxylase deficiency
- ☐ Bartter's syndrome
- ☐ Liddle's syndrome

Cushing's syndrome

8%

Conn's syndrome

14%

11-beta hydroxylase deficiency

14%

Bartter's syndrome

47%

Liddle's syndrome

16%

Bartter's syndrome is associated with normotension

Important for me Less important

Bartter's syndrome is an inherited cause (usually autosomal recessive) of severe hypokalaemia due to defective chloride absorption at the $\text{Na}^+ \text{K}^+ 2\text{Cl}^-$ cotransporter in the ascending loop of Henle

Dr Assem

A scientist is studying the role of regulatory proteins in intracellular trafficking. He has isolated and identified various intracellular proteins tagged with mannose-6-phosphate.

These proteins are destined to which of the following organelles?

- ☐ Lysosome
- ☐ Smooth endoplasmic reticulum
- ☐ Rough endoplasmic reticulum
- ☐ Nucleus
- ☐ Mitochondria

Lysosome

38%

Smooth endoplasmic reticulum

15%

Rough endoplasmic reticulum

30%

Nucleus

6%

Mitochondria

12%

Golgi adds mannose-6-phosphate to proteins for trafficking to lysosomes

Important for me Less important

Golgi adds mannose-6-phosphate to proteins for trafficking to lysosomes

Dr Assem

CD4

24%

CD2b

6%

CD1

8%

CD8

55%

CD2

7%

CD8 - co-receptor for MHC class I

Important for me Less important

Which one of the following molecules acts as the co-receptor for cells expressing antigens combined with MHC class I molecules?

☐ CD4

☐ CD2b

☐ CD1

☐ CD8

☐ CD2

A young boy is diagnosed as having DiGeorge syndrome. Which one of the following infections is he most at risk from, secondary to his immune system dysfunction?

- ☐ *Klebsiella pneumoniae*
- ☐ *Haemophilus influenzae* type *b*
- ☐ *Cryptococcus neoformans*
- ☐ *Neisseria meningitidis*
- ☐ *Salmonella typhi*

Klebsiella pneumoniae

12%

Haemophilus influenzae type b

27%

Cryptococcus neoformans

36%

Neisseria meningitidis

19%

Salmonella typhi

6%

Patients who have T-cell dysfunction are most at risk from recurrent viral and fungal infections.

A follow-up study is performed looking at the height of 100 adults who were given steroids during childhood. The average height of the adults is 169cm, with a standard deviation of 16cm. What is the standard error of the mean?

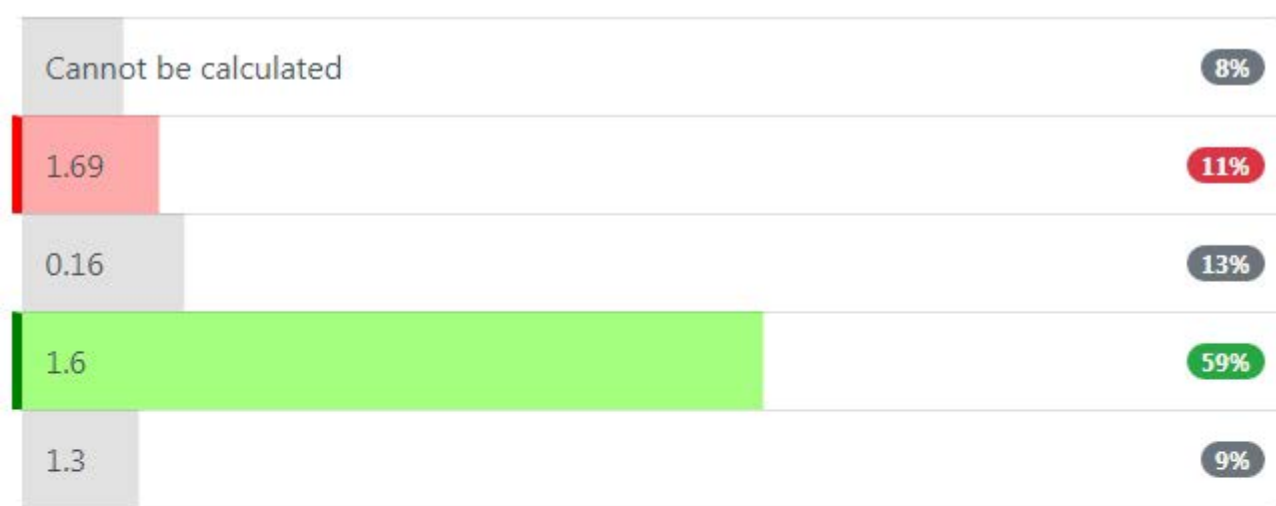
☐ Cannot be calculated

☐ 1.69

☐ 0.16

☐ 1.6

☐ 1.3



Standard error of the mean = standard deviation / square root (number of patients)

Important for me Less important

The standard error of the mean is calculated by the standard deviation / square root (number of patients)

$$= 16 / \text{square root}(100) = 16 / 10 = 1.6$$

Which foramen does the maxillary nerve go through?

- ☐ Jugular foramen
- ☐ Foramen ovale
- ☐ Superior orbital fissure
- ☐ Optic canal
- ☐ Foramen rotundum

Jugular foramen

11%

Foramen ovale

22%

Superior orbital fissure

18%

Optic canal

5%

Foramen rotundum

45%

A 77-year-old woman who lives alone is assessed. She has a history of Alzheimer's disease. Her neighbours are increasingly concerned about her behaviour - they often see her wandering around outside in an apparently confused state. You feel she may need a care package or residential care but she refuses to countenance such a proposal. What is the most appropriate legal framework to use to approach this issue?

- ☐ Mental Health Act
- ☐ Mental Capacity Act
- ☐ Health and Social Care Act
- ☐ Common law
- ☐ Professional Performance Act

Mental Health Act	14%
Mental Capacity Act	54%
Health and Social Care Act	24%
Common law	5%
Professional Performance Act	4%

As this is not a mental health disorder the most appropriate legal framework to use is the Mental Capacity Act.

The Mental Capacity Act of 2005 came into force in 2007. It applies to adults over the age of 16 and sets out who can take decisions if a patient becomes incapacitated (e.g. following a stroke). Mental capacity includes the ability to make decisions affecting daily life, healthcare and financial issues.

The Act contains 5 key principles:

- A person must be assumed to have capacity unless it is established that he lacks capacity
- A person is not to be treated as unable to make a decision unless all practicable steps to help him to do so have been taken without success
- A person is not to be treated as unable to make a decision merely because he makes an unwise decision
- An act done, or decision made, under this Act for or on behalf of a person who lacks capacity must be done, or made, in his best interests
- Before the act is done, or the decision is made, regard must be had to whether the purpose for which it is needed can be as effectively achieved in a way that is less restrictive of the person's rights and freedom of action

You are caring for a local cardiology consultant's father who has been admitted following a myocardial infarction. He bleeps you from the switchboard and asks how his father is doing. You recognise his voice on the phone. What is the most appropriate response?

- ☐ Decline to give any details over the phone but offer to meet the consultant face-to-face for a chat
- ☐ As a matter of professional courtesy ask for his advice on post-myocardial infarction care
- ☐ Ask permission from his father then give relevant details
- ☐ Give full details include the troponin I value and offer to fax the ECG
- ☐ Say he is 'doing fine'

Decline to give any details over the phone but offer to meet the consultant face-to-face for a chat	16%
As a matter of professional courtesy ask for his advice on post-myocardial infarction care	5%
Ask permission from his father then give relevant details	68%
Give full details include the troponin I value and offer to fax the ECG	6%
Say he is 'doing fine'	5%

The main nub of this question relates to confidentiality. You cannot give details over the phone to anyone, even his son, without the patient's express permission. Whilst it may be presumed that this is what the patient would want it is impossible to be sure of the family dynamics.

If the patient has given permission and you are sure you are speaking to the son then giving relevant details is the best option. Asking the consultant to come in as an option but may not be necessary if the previous conditions are met. Saying he is 'doing fine' is unlikely to satisfy a consultant cardiologist.

Giving details without first getting permission from the patient is breaking confidentiality, however well intentioned. Involving a relative in the management of a patient is inappropriate and the worst option.

Which of the following conditions is NOT inherited in a X-linked recessive fashion:

- ☐ Myotonic dystrophy
- ☐ G6PD deficiency
- ☐ Haemophilia B
- ☐ Colour blindness
- ☐ Fabry's disease

Myotonic dystrophy

52%

G6PD deficiency

13%

Haemophilia B

9%

Colour blindness

9%

Fabry's disease

16%

X-linked conditions: Duchenne/Becker, haemophilia, G6PD

Important for me Less important

A 22-year-old gentleman is admitted to the Emergency Department with worsening shortness of breath with signs of left ventricular failure. He has a known genetic condition.

On examination, you note an ejection systolic murmur loudest over the aortic area radiating to the carotids, bibasal crepitations and pitting oedema to the knees bilaterally. On closer inspection of the patient, you note a wide vermillion border, small spaced teeth and a flat nasal bridge. The patient also has a disinhibited friendly demeanour.

What is the likely precipitating valvular issue?

- ☐ Subvalvular aortic stenosis
- ☐ Supravalvular aortic stenosis
- ☐ Valvular aortic stenosis
- ☐ Aortic sclerosis
- ☐ Aortic regurgitation

Subvalvular aortic stenosis

17%

Supravalvular aortic stenosis

53%

Valvular aortic stenosis

14%

Aortic sclerosis

7%

Aortic regurgitation

9%

The answer is supravalvular aortic stenosis, which is associated with a condition called William's syndrome. This syndrome is a genetic condition associated with transient neonatal hypercalcaemia, short stature, and a friendly demeanour.

A subvalvular aortic stenosis is associated with hypertrophic obstructive cardiomyopathy. Aortic sclerosis does not typically cause radiation to the carotids and associated with a more senior demographic. Aortic regurgitation is associated with an early diastolic murmur and valvular aortic stenosis tends to be related to senile calcification or a bicuspid aortic valve.

Dr Assem

A 59-year-old male patient presents to the gastroenterology clinic with a 6-month history of abdominal pain, diarrhoea and weight loss. Gastrosocopy reveals a gastrinoma in the antrum of the stomach.

What is the function of the hormone secreted by this tumour?

- ☐ It increases HCL production and reduces gastric motility
- ☐ It increases the secretion of pancreatic fluid
- ☐ It inhibits HCL production and reduces gastric motility
- ☐ It increases HCL production and increases gastric motility
- ☐ It inhibits HCL production and increases gastric motility

It increases HCL production and reduces gastric motility

16%

It increases the secretion of pancreatic fluid

2%

It inhibits HCL production and reduces gastric motility

4%

It increases HCL production and increases gastric motility

72%

It inhibits HCL production and increases gastric motility

5%

Gastrin increases HCL production and gastrointestinal motility

Important for me Less important

Gastrinoma is a gastrin-secreting tumour. Gastrin increase HCL production and gastrointestinal motility.

Options 1 is incorrect because gastrin actually decreases gastric motility.

Option 2 is incorrect because gastrin doesn't increase the secretion of pancreatic fluid. VIP, CCK and secretin increases the secretion of pancreatic fluid.

Option 3 is incorrect because gastrin increases HCL production and increases gastric motility.

Option 5 is incorrect because gastrin increases HCL production.

Which one of the following statements regarding the power of a study is correct?

- ☐ Is the probability of rejecting the null hypothesis when it is false
- ☐ Decreases with increasing sample size
- ☐ Lies within 2 standard deviations of the mean
- ☐ Is the chance a significant p value will be reached
- ☐ Is equal to $1 - (\text{the probability of a type I error})$

Is the probability of rejecting the null hypothesis when it is false

42%

Decreases with increasing sample size

9%

Lies within 2 standard deviations of the mean

7%

Is the chance a significant p value will be reached

17%

Is equal to $1 - (\text{the probability of a type I error})$

24%

Power = $1 - \text{the probability of a type II error}$

Important for me Less important

The power of a study may be defined in a number of ways:

- in general terms, the probability that a statistically significant difference will be detected
- probability of (correctly) rejecting the null hypothesis when it is false
- which also means the probability of confirming the alternative hypothesis when the alternative hypothesis is true
- power = $1 - \text{the probability of a type II error}$ or $1 - \beta$

A rapid urine screening test is developed to detect *Chlamydia*. A trial involving 200 men and women is performed comparing the new test to the existing NAAT techniques:

	<i>Chlamydia</i> present	<i>Chlamydia</i> absent
New test positive	20	3
New test negative	5	172

What is the negative predictive value of the new test?

☐ 172/177

☐ 20/23

☐ 172/192

☐ 172/175

☐ 20/25



Negative predictive value = $TN / (TN + FN)$

Important for me Less important

Negative predictive value = $TN / (TN + FN)$

= $172 / (172 + 5)$

Which foramen does the oculomotor nerve go through?

- ☐ Superior orbital fissure
- ☐ Foramen ovale
- ☐ Foramen rotundum
- ☐ Optic canal
- ☐ Inferior orbital fissure

Superior orbital fissure

63%

Foramen ovale

8%

Foramen rotundum

9%

Optic canal

10%

Inferior orbital fissure

10%

Each one of the following is associated with Noonan's syndrome, except:

- ☐ Webbed neck
- ☐ Short stature
- ☐ Factor XI deficiency
- ☐ Pulmonary valve stenosis
- ☐ Abnormal karyotype

Webbed neck

20%

Short stature

6%

Factor XI deficiency

27%

Pulmonary valve stenosis

11%

Abnormal karyotype

36%

In contrast to Turner's syndrome, the karyotype is normal

A 64-year-old man collapses and dies shortly after complaining of chest pain. During the post-mortem extensive coronary artery disease is found. Examination of the atherosclerotic plaques reveals multiple foam cells. What is the origin of foam cells?

- ☐ Neutrophils
- ☐ Cardiac myocytes
- ☐ Macrophages
- ☐ Endothelial cells
- ☐ Lymphocytes

Neutrophils

4%

Cardiac myocytes

4%

Macrophages

82%

Endothelial cells

8%

Lymphocytes

3%

Foam cells are fat-laden macrophages

Important for me Less important

A 25-year-old man is counselled regarding the genetics of Huntington's disease. Which one of the following best describes the concept of anticipation?

- ☐ The psychological effect of a patient knowing they will develop an incurable condition
- ☐ Earlier age of onset in successive generations
- ☐ More severe disease in successive generations
- ☐ Where there is a known history of inherited conditions, patients may attribute symptoms to the onset of the disease
- ☐ Screening at risk families to allow early intervention and improve outcomes

The psychological effect of a patient knowing they will develop an incurable condition

8%

Earlier age of onset in successive generations

52%

More severe disease in successive generations

18%

Where there is a known history of inherited conditions, patients may attribute symptoms to the onset of the disease

9%

Screening at risk families to allow early intervention and improve outcomes

13%

Anticipation in trinucleotide repeat disorders = **earlier onset** in successive generations

Important for me Less important

Difficult question. In the exam both B and C were given as choices. The 'classic' definition of anticipation is earlier onset in successive generations. However, in most cases, an increase in the severity of symptoms is also noted. If both options are presented then B should be chosen, as this represents the more accepted definition of anticipation. What do you think?

Patients with deficiencies of which one of the following complement proteins are most predisposed to disseminated meningococcal infection?

☐ C1

☐ C2

☐ C3

☐ C4

☐ C5



Whilst C3 deficiency is associated with recurrent bacterial infections, C5 deficiency is more characteristically associated with disseminated meningococcal infection

A 45-year-old woman was commenced on treatment for a tuberculosis infection, 3 months ago. She has since developed a burning sensation at the base of her feet.

Which of the following medications may have caused this new 'burning sensation'?

- ☐ Rifampicin
- ☐ Isoniazid
- ☐ Pyrazinamide
- ☐ Ethambutol
- ☐ Amoxicillin

Rifampicin

5%

Isoniazid

65%

Pyrazinamide

18%

Ethambutol

8%

Amoxicillin

4%

Isoniazid therapy can cause a vitamin B6 deficiency causing peripheral neuropathy

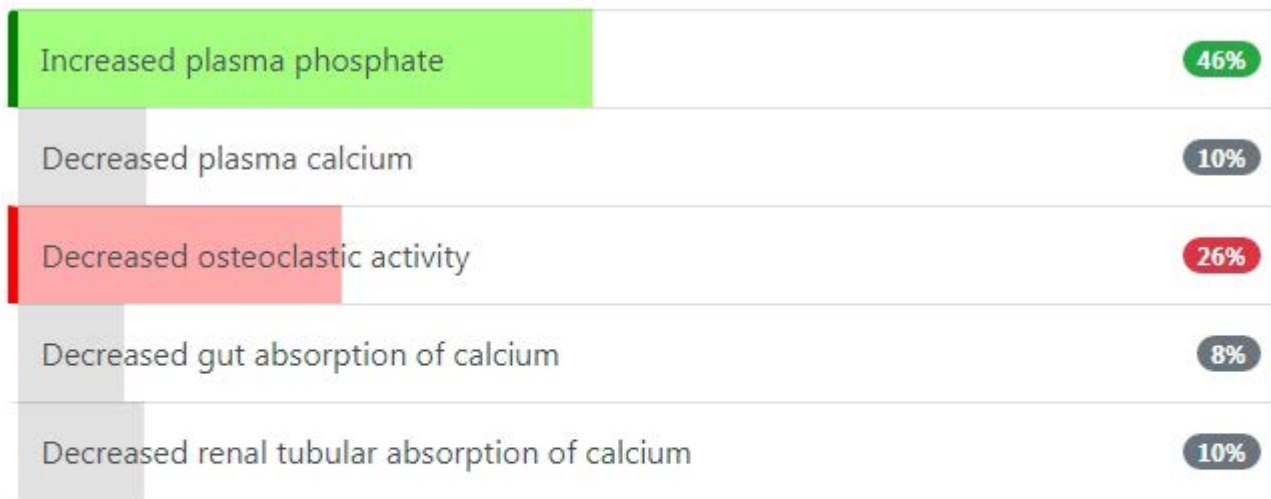
Important for me Less important

TB drugs have a variety of side effects, many of which are widely tested in medical school examinations. This patient is reporting evidence of a peripheral neuropathy which can be caused by the vitamin b6 deficiency that can result with Isoniazid therapy. Usually, prophylactic pyridoxine hydrochloride is prescribed at the same time as Isoniazid to prevent the peripheral neuropathy.

Dr Assem

Vitamin D causes which one of the following:

- ☐ Increased plasma phosphate
- ☐ Decreased plasma calcium
- ☐ Decreased osteoclastic activity
- ☐ Decreased gut absorption of calcium
- ☐ Decreased renal tubular absorption of calcium



Vitamin D increases plasma calcium and plasma phosphate levels by promoting renal tubular absorption and gut absorption of calcium and increasing renal phosphate reabsorption

Which one of the following conditions is NOT an autosomal recessive condition?

- ☐ Haemochromatosis
- ☐ PKU
- ☐ Hereditary spherocytosis
- ☐ Tay-Sach's
- ☐ Friedreich's ataxia

Haemochromatosis	14%
PKU	9%
Hereditary spherocytosis	38%
Tay-Sach's	10%
Friedreich's ataxia	28%

Autosomal recessive conditions are 'metabolic' - exceptions: inherited ataxias

Autosomal dominant conditions are 'structural' - exceptions: Gilbert's, hyperlipidaemia type II

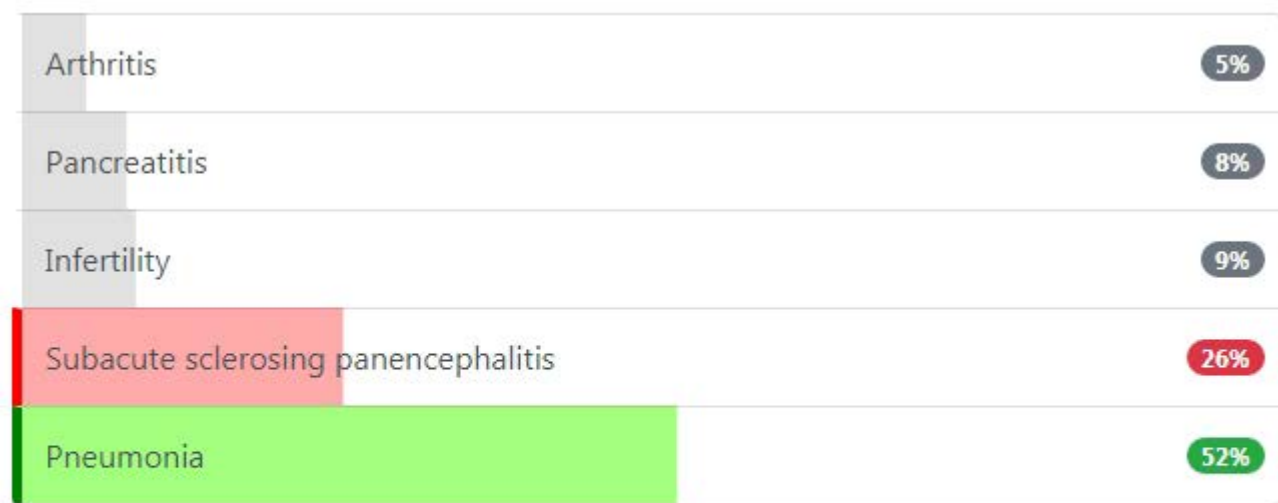
Important for me Less important

Dr Assem

Hereditary spherocytosis is inherited in an autosomal dominant fashion.

A male child from a travelling community is diagnosed with measles. Which one of the following complications is he at risk from in the immediate aftermath of the initial infection?

- ☐ Arthritis
- ☐ Pancreatitis
- ☐ Infertility
- ☐ Subacute sclerosing panencephalitis
- ☐ Pneumonia



Subacute sclerosing panencephalitis is seen but develops 5-10 years following the illness.
Pancreatitis and infertility may follow mumps infection

Which layer of the epidermis is immediately next to the dermis?

- ☐ Stratum granulosum
- ☐ Stratum lucidum
- ☐ Stratum corneum
- ☐ Stratum germinativum
- ☐ Stratum spinosum

Stratum granulosum

16%

Stratum lucidum

7%

Stratum corneum

20%

Stratum germinativum

45%

Stratum spinosum

11%

Epidermis - 5 layers - bottom layer = stratum germinativum which gives rise to keratinocytes and contains melanocytes

Important for me Less important

A 54-year-old woman who is obese comes to the Emergency department complaining of pain at the back of her right knee and swelling of the right calf, which she tells you came on all of a sudden. She is awaiting a knee replacement for osteoarthritis of the right knee. Routine blood testing reveals that the D-dimer is in the normal range.

Which of the following is the most likely diagnosis?

- ☐ Deep vein thrombosis
- ☐ Ruptured popliteal cyst
- ☐ Pseudogout
- ☐ Ruptured calf muscle
- ☐ Septic arthritis

Deep vein thrombosis

7%

Ruptured popliteal cyst

74%

Pseudogout

5%

Ruptured calf muscle

10%

Septic arthritis

5%

Sudden onset of pain, particularly when this is associated first with symptoms behind the knee, and calf swelling, is very suspicious of an underlying ruptured popliteal cyst. The fact she is awaiting a right total knee replacement also suggests significant osteoarthritis of the knee, which predisposes to the condition. Physiotherapy and analgesia are the mainstay of therapy for the condition. Patients may complain of posterior knee and calf pain for a number of weeks after the original incident.

The fact that pain began behind the knee, and that the D-dimer is normal, counts against a diagnosis of deep vein thrombosis. Pseudogout is primarily associated with anterior knee pain and swelling, as is septic arthritis. A ruptured calf muscle is more likely to present with pain in the body of the calf itself, rather than pain behind the knee.

An 18-year-old university student goes to see her GP due to a sore throat. She also has a marked fever and says she has been feeling tired for the past three weeks. On examination, she has swollen cervical lymph nodes. An antibody test confirms infectious mononucleosis. Which cell surface protein does the Epstein-Barr virus bind to?

☐ CD3

☐ CD4

☐ CD14

☐ CD15

☐ CD21



CD21 is the receptor for the Epstein-Barr virus

Important for me Less important

Infectious mononucleosis is caused by the Epstein-Barr virus (EBV) - CD21 is the receptor for EBV.

CD3 is a cell surface marker found on all T cells. CD4 is a cell surface marker found on T helper cells. CD14 is a cell surface marker found on macrophages. CD15 is a cell surface marker found on Reed-Sternberg cells.

A 16-year-old female is brought to her primary care physician by her parents with a complaint of short stature and delayed puberty. Further questioning reveals primary amenorrhoea. The patient's height is significantly shorter than her midparental height.

On physical examination, she is in Tanner Stage I for breast development and in early Tanner Stage II for pubic hair development. She also has a webbed neck.

Laboratory investigations show a significantly raised Luteinizing Hormone (LH) and Follicle-Stimulating Hormone (FSH) with reduced oestrogen levels. Karyotyping confirms the diagnosis.

Which of the following cardiac pathologies is most commonly associated with this condition?

- ☐ Coarctation of the aorta
- ☐ Aortic dissection
- ☐ Mitral stenosis
- ☐ Hypertrophic cardiomyopathy
- ☐ Patent ductus arteriosus

Coarctation of the aorta

79%

Aortic dissection

7%

Mitral stenosis

5%

Hypertrophic cardiomyopathy

4%

Patent ductus arteriosus

5%

Turner's syndrome is associated with aortic coarctation

Important for me [Less important](#)

The stem in question lists some of the classic features of Turner Syndrome (45, XO). Bicuspid aortic valve and aortic coarctation are both common cardiac complications of this syndrome.

Dr. Assem

A new blood test which can show signs of myocardial damage within one hour of the onset of chest pain is developed. In a trial of 100 patients presenting with chest pain, 40 of the patients are later proven to have had myocardial ischaemia by conventional troponin tests. Of these patients the new test was positive in 20 cases. The new test was also positive in 20 of the remaining 60 patients later shown to have a negative troponin. What is the negative predictive value of the new test for myocardial ischaemia?

☐ 0.5

☐ 0.66

☐ 0.8

☐ Cannot calculate

☐ 0.33

0.5	15%
0.66	44%
0.8	14%
Cannot calculate	11%
0.33	16%

Negative predictive value = $TN / (TN + FN)$

Important for me Less important

The new test was negative in 20 of the patients later shown to have myocardial ischaemia (false negative) and negative in 40 patients confirmed not to have myocardial ischaemia (true negative)

Negative predictive value = $TN / (TN + FN)$

$= 40 / (40 + 20) = 0.66$

What is the main advantage of non-inferiority trials when testing a new drug?

- ☐ Prevents ethical dilemmas
- ☐ Robust results are produced
- ☐ Useful for conditions where there is no proven drug treatment
- ☐ Useful for conditions where there is a high placebo response rate
- ☐ Small sample size is required

Prevents ethical dilemmas

15%

Robust results are produced

8%

Useful for conditions where there is no proven drug treatment

21%

Useful for conditions where there is a high placebo response rate

17%

Small sample size is required

38%

A 10-year-old boy is found to have haemophilia A following investigation for a haemoarthrosis. Which one of his relatives is most likely to have the condition?

- ☐ Father
- ☐ Mother's brother
- ☐ Father's sister
- ☐ Mother
- ☐ Father's brother

Father	19%
Mother's brother	53%
Father's sister	5%
Mother	16%
Father's brother	7%

X-linked recessive conditions are only seen in males which therefore excludes two of the options. As male to male transmission is not seen this means the answer is mother's brother.

Which of the following statements is true regarding X-linked recessive inheritance?

- ☐ A female child of a heterozygous female carrier has a 50% chance of being a carrier
- ☐ An example is Friedreich's ataxia
- ☐ 50% of the male offspring of affected males will manifest the disease
- ☐ An affected child's uncle on the paternal side will also manifest the disease
- ☐ 50% of the female offspring of affected males will be carriers

A female child of a heterozygous female carrier has a 50% chance of being a carrier

54%

An example is Friedreich's ataxia

9%

50% of the male offspring of affected males will manifest the disease

8%

An affected child's uncle on the paternal side will also manifest the disease

6%

50% of the female offspring of affected males will be carriers

22%

Which one of the following techniques would be most suitable to detect and quantify a viral protein?

Polymerase chain reaction

32%

Northern blotting

7%

Western blotting

49%

Southern blotting

8%

Eastern blotting

4%

Polymerase chain reaction

32%

Northern blotting

7%

Western blotting

49%

Southern blotting

8%

Eastern blotting

4%

Molecular biology techniques

- SNOW (**S**outh - **N**orth - **W**est)
- DROP (**D**NA - **R**NA - **P**rotein)

Important for me

Less important

Dr Assem

A 64-year-old woman, whose husband had a TIA one month ago brings you a newspaper article with the headline 'new super drug prevents stroke'. Reading through the article with her, it states that a recent clinical trial has shown that a new lipid-lowering therapy for stroke had a number needed to treat (NNT) of 20 for the prevention of the primary end-point. How do you best describe these results to her?

- ☐ 20 extra patients in the placebo group had a stroke
- ☐ For 1000 patients treated with active therapy, there would be 50 fewer strokes
- ☐ For 1000 patients treated with active therapy, there would be 20 fewer strokes
- ☐ For every 1000 patients treated with active therapy there would be 100 fewer strokes
- ☐ 20 patients in the treatment group were protected from stroke

20 extra patients in the placebo group had a stroke

6%

For 1000 patients treated with active therapy, there would be 50 fewer strokes

48%

For 1000 patients treated with active therapy, there would be 20 fewer strokes

26%

For every 1000 patients treated with active therapy there would be 100 fewer strokes

6%

20 patients in the treatment group were protected from stroke

13%

This prevention study for stroke reveals that 20 patients need to be treated to prevent one event.

Thus if you treat 1000 patients then you will expect to have 50 fewer strokes.

NNT is a time-specific epidemiological measure of the number of patients who need to be treated in order to prevent one adverse outcome. A perfect NNT would be 1, where everyone improves with treatment, thus the higher the NNT, the less effective the treatment.

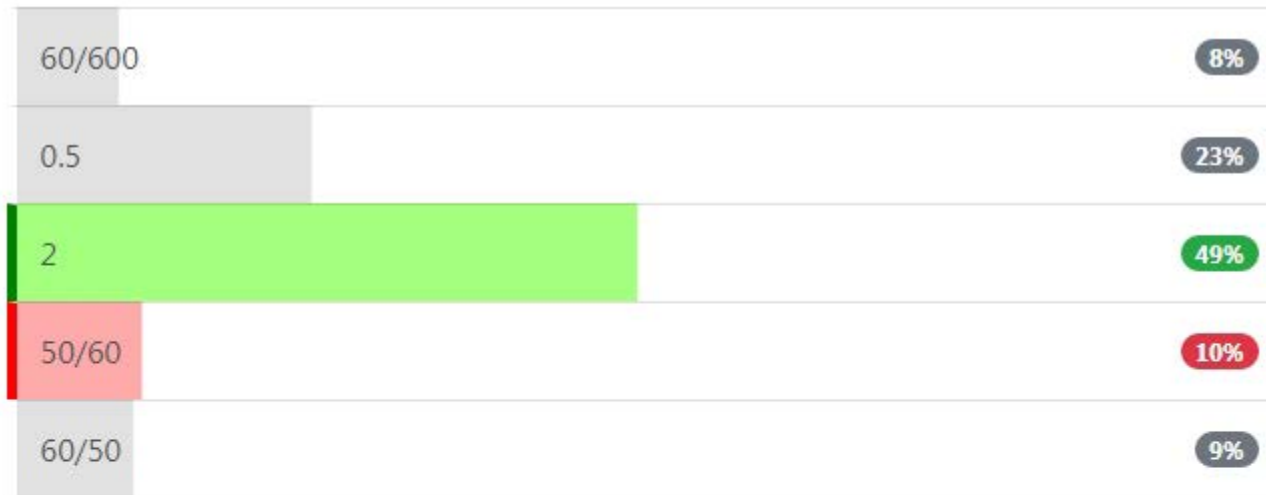
A cohort study is designed to look at the association between working long hours and blood pressure.

The following results are obtained after 10 years of follow-up:

	Number of patients with normal blood pressure after 10 years	Number of patients diagnosed with hypertension after 10 years	Total
Working < 40 hours/ week	1000	50	1,050
Working > 40 hours/ week	600	60	660

What is the odds ratio of developing hypertension if you work more than 40 hours/week compared to people who work less than 40 hours/week?

- ☐ 60/600
- ☐ 0.5
- ☐ 2
- ☐ 50/60
- ☐ 60/50



The odds of developing hypertension if you work < 40 hours/week is $50 / 1000 = 1 / 20$ or 0.05

The odds of developing hypertension if you work > 40 hours/week is $60 / 600 = 1 / 10$ or 0.1

The odds ratio is therefore = (odds of developing hypertension if you work > 40 hours/week) / (odds of developing hypertension if you work < 40 hours/week) = $0.1 / 0.05 = 2$

Which one of the following best describes the Haldane effect?

- ☐ Increase in pO_2 means CO_2 binds less well to Hb
- ☐ Increasing acidity (or pCO_2) means oxygen binds less well to Hb
- ☐ Decreasing acidity (or pCO_2) means oxygen binds less well to Hb
- ☐ Raised 2,3-DPG enhances oxygen delivery to the tissues
- ☐ Decrease in pO_2 means CO_2 binds less well to Hb

Increase in pO_2 means CO_2 binds less well to Hb

48%

Increasing acidity (or pCO_2) means oxygen binds less well to Hb

26%

Decreasing acidity (or pCO_2) means oxygen binds less well to Hb

8%

Raised 2,3-DPG enhances oxygen delivery to the tissues

11%

Decrease in pO_2 means CO_2 binds less well to Hb

7%

Which of the following secondary causes of hyperlipidaemia result in predominantly hypercholesterolaemia, as opposed to hypertriglyceridaemia?

☐ Hypothyroidism

☐ Obesity

☐ Liver disease

☐ Bendrofluazide

☐ Chronic renal failure

Hypothyroidism

40%

Obesity

14%

Liver disease

18%

Bendrofluazide

12%

Chronic renal failure

16%

Hypercholesterolaemia rather than hypertriglyceridaemia: nephrotic syndrome, cholestasis, hypothyroidism

Important for me Less important

You review a 21-year-old woman who has recently been diagnosed with type 1 diabetes mellitus. She was admitted three months ago with vomiting, abdominal pain and weight loss and was found to hyperglycaemic. A diagnosis of type 1 diabetes mellitus was made. She was started on insulin. Recent bloods show the following:

Na ⁺	140 mmol/l
K ⁺	3.8 mmol/l
Urea	3.4 mmol/l
Creatinine	72 mol/l

Total cholesterol	5.1 mmol/l
HDL cholesterol	1.0 mmol/l
LDL cholesterol	2.9 mmol/l
Triglyceride	1.7 mmol/l

Urine dip: No protein or blood

She has no family history of note and her body mass index is 20.5 kg/m. What is the most appropriate management with regards to lipid modification?

- ☐ Start atorvastatin 10mg on
- ☐ Start atorvastatin 20mg on
- ☐ Start atorvastatin 40mg on
- ☐ Perform a QRISK2 assessment
- ☐ Reassure her that lipid modification therapy is not required at this stage

Start atorvastatin 10mg on

7%

Start atorvastatin 20mg on

20%

Start atorvastatin 40mg on

7%

Perform a QRISK2 assessment

28%

Reassure her that lipid modification therapy is not required at this stage

38%

NICE specifically state that we should not use QRISK2 for type 1 diabetics. Instead, the following criteria are used:

- older than 40 years, or
- have had diabetes for more than 10 years or
- have established nephropathy or
- have other CVD risk factors

None of these apply in this case.

Which one of the following cell organelles contains double-stranded circular DNA?

- ☐ Nucleus
- ☐ Ribosome
- ☐ Nucleolus
- ☐ Golgi apparatus
- ☐ Mitochondria

Which one of the following cell organelles contains double-stranded circular DNA?

Nucleus

25%

Ribosome

6%

Nucleolus

16%

Golgi apparatus

4%

Mitochondria

49%

Dr. Russell

Which one of the following best describes the main action of the polymerase chain reaction?

☐ DNA identification using RNA

☐ DNA amplification

☐ RNA translation to protein

☐ RNA amplification

☐ DNA to RNA conversion

DNA identification using RNA

14%

DNA amplification

60%

RNA translation to protein

7%

RNA amplification

11%

DNA to RNA conversion

8%

Dr. Asem

Which one of the following statements regarding the normal distribution is correct?

- ☐ Is a discrete probability distribution
- ☐ 99.7% of values lie within 2 standard deviations of the mean
- ☐ Mean = mode = median
- ☐ Standard deviation = mean / square root (variance)
- ☐ Is also referred to as the binomial distribution

Is a discrete probability distribution

6%

99.7% of values lie within 2 standard deviations of the mean

7%

Mean = mode = median

62%

Standard deviation = mean / square root (variance)

12%

Is also referred to as the binomial distribution

13%

The Normal distribution is a continuous probability distribution

Which one of the following best describes the function of the p53 gene?

- ☐ Inhibits angiogenesis
- ☐ Oncogene
- ☐ Encodes proteins which regulate the cell cycle
- ☐ Encodes proteins which activate of natural killer cells
- ☐ Encodes proteins which directly repair damaged DNA

Inhibits angiogenesis

8%

Oncogene

23%

Encodes proteins which regulate the cell cycle

40%

Encodes proteins which activate of natural killer cells

10%

Encodes proteins which directly repair damaged DNA

20%

Whilst p53 can trigger cell cycle arrest to allow DNA to be repaired the encoded proteins do not directly repair DNA.

A new blood test to screen patients for heart failure is trialled on 500 patients. The test was positive in 40 of the 50 patients shown to have heart failure by echocardiography. It was also positive in 20 patients who were shown not to have heart failure. What is the positive predictive value of the test?

☐ 0.8

☐ 0.66

☐ 0.33

☐ 0.1

☐ Cannot be calculated

0.8	17%
0.66	58%
0.33	10%
0.1	8%
Cannot be calculated	7%

Negative predictive value = $TN / (TN + FN)$

Important for me Less important

A contingency table can be constructed from the above data, as shown below:

	Heart failure	No heart failure
Test positive	40	20
Test negative	10	430

Positive predictive value = $TP / (TP + FP) = 40 / (40 + 20) = 0.66$

A 24-year-old female present with a tonic-clonic seizure which self-resolved after 3 minutes. There was no warning before the seizure and her boyfriend says there was no incontinence or tongue biting. She complained she was having a mild headache, on and off for the last 2 weeks. Her most recent travel history included a trip to Turkey 3 years ago where she doesn't remember what she exactly ate. There were no other symptoms. On examination, there were no signs of neurological deficit or signs of raised intracranial hypertension. She had a CT head which demonstrated numerous small focal calcification throughout both cerebral hemispheres with no enhancement. What is the most likely diagnosis?

- ☐ Cerebral abscess
- ☐ Neurocysticercosis
- ☐ Cerebral metastasis
- ☐ Amoebic encephalitis
- ☐ Tuberculomas

Cerebral abscess	4%
Neurocysticercosis	67%
Cerebral metastasis	3%
Amoebic encephalitis	15%
Tuberculomas	10%

Neurocysticercosis often presents initially as a seizure. It also can present as headaches, altered mental state, and neurological deficits. It occurs from eating food or drinking water contaminated by human faeces containing *T. solium* eggs. The time between initial presentation and ingestion is extremely varied. It has characteristic neuroimaging findings which depend on the stage of the disease. The stage described in this patient is the nodular calcified stage which is represented here by multiple calcified lesions on the CT head. It is important to note neurocysticercosis is extremely rare and on clinical examination alone, this diagnosis would be very low on the list of differential diagnosis. The other 4 options can all present as a tonic-seizure and headache. However, the CT findings are only characteristic of neurocysticercosis. The other 4 options do not have such characteristic CT findings of numerous small focal calcification throughout both hemispheres and therefore it is impossible for these options to be the answer. As well as the characteristic imaging findings, the trip to Turkey is another clue. Cerebral abscess, cerebral metastasis and tuberculomas will all typically show enhancing lesions on CT. Amoebic encephalitis often appears normal on CT in the early stages and then may show some patchy low-level enhancement after that.

An 18-year-old female is admitted with a headache, photophobia, fever and confusion. She is managed with empirical antibiotics. What is the mechanism of action of the most commonly used first line antibiotic class?

- ☐ Inhibition of RNA polymerase
- ☐ Inhibition of cell wall synthesis
- ☐ Inhibition of DNA gyrase
- ☐ Inhibition of the ribosome
- ☐ Inhibition of folate synthesis

Inhibition of RNA polymerase

6%

Inhibition of cell wall synthesis

78%

Inhibition of DNA gyrase

5%

Inhibition of the ribosome

7%

Inhibition of folate synthesis

4%

Cephalosporins act by inhibiting cell wall formation

Important for me Less important

The correct answer is inhibition of cell wall synthesis. The first line antibiotics for possible bacterial meningitis are cephalosporins. Penicillins, cephalosporins, carbapenems and monobactams all act via inhibition of cell wall synthesis.

BNF

<https://bnf.nice.org.uk/treatment-summary/cephalosporins.html>

Dr Assem

A 35-year-old male has recently had a splenectomy following damage to his spleen in a motorcycle accident. He is up to date with all vaccinations which were offered as part of his childhood vaccination scheme. It is July. Which of the following vaccinations does he require in the first instance?

- ☐ Influenza, pneumococcus, Haemophilus type B, pertussis
- ☐ Pneumococcus, meningitis ACWY, pertussis
- ☐ Meningococcus type B and C, Haemophilus type B, BCG
- ☐ Pneumococcus, meningococcus type B and C, Haemophilus type B
- ☐ Haemophilus type B, pneumococcus, BCG, meningitis ACWY

Influenza, pneumococcus, Haemophilus type B, pertussis

20%

Pneumococcus, meningitis ACWY, pertussis

4%

Meningococcus type B and C, Haemophilus type B, BCG

4%

Pneumococcus, meningococcus type B and C, Haemophilus type B

64%

Haemophilus type B, pneumococcus, BCG, meningitis ACWY

7%

Patients with hyposplenism should be vaccinated against pneumococcal, Haemophilus type B and meningococcus type C

Important for me Less important

Adults who have had an unplanned splenectomy should be vaccinated against Pneumococcus, meningococcus type B and C, and Haemophilus type B initially. These vaccines should be given at least 14 days post-splenectomy for maximal efficacy. They should also receive the influenza vaccine if during the autumn or winter months. They should also have meningitis ACWY and a further dose of meningitis B after 2 months.

NICE Evidence search: post-splenectomy antibiotics

Dr Assem

A new test to screen for pulmonary embolism (PE) is used in 100 patients who present to the Emergency Department. The test is positive in 30 of the 40 patients who are proven to have a PE. Of the remaining 60 patients, only 5 have a positive test. What is the sensitivity of the new test?

☐ 8.33%

☐ 30%

☐ 40%

☐ 66.66%

☐ 75%



A contingency table can be constructed from the above data, as shown below:

	PE diagnosed	No PE
Test positive	30	5
Test negative	10	55

The sensitivity is therefore $30 / (30 + 10) = 75\%$

Dr Assem

A patient receives vincristine to help treat non-Hodgkin's lymphoma. What stage in the cell cycle does vincristine act?

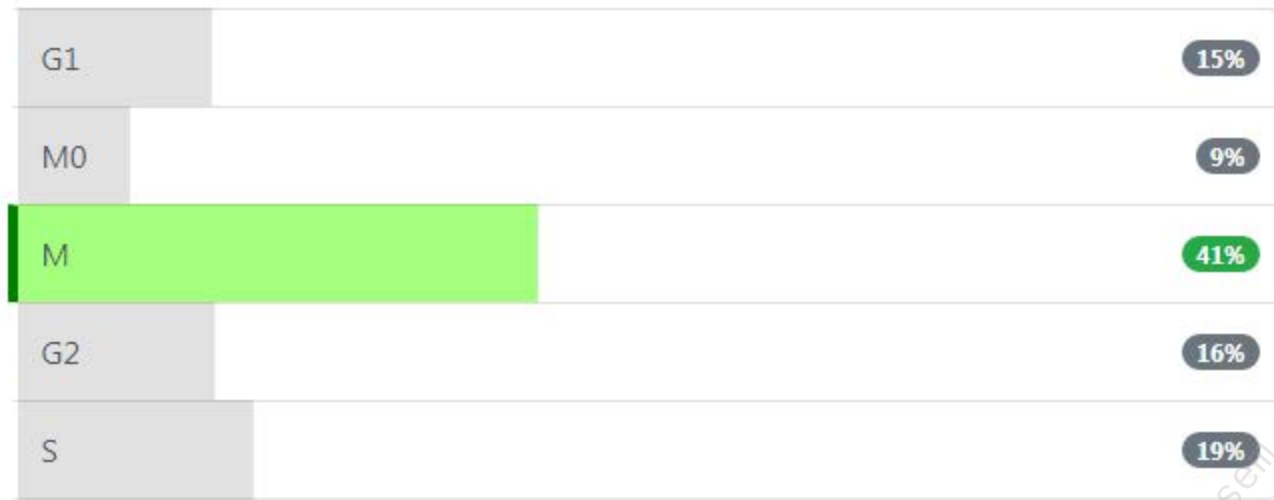
☐ G1

☐ M0

☐ M

☐ G2

☐ S



Vincristine inhibits formation of microtubules and arrests mitosis

A 19-year-old man with a history of learning disabilities and ectopia lentis is diagnosed as having homocystinuria. Supplementation of which one of the following may help improve his condition?

- ☐ Folic acid
- ☐ Niacin
- ☐ Pyridoxine
- ☐ Vitamin B7
- ☐ Thiamine

Folic acid

9%

Niacin

16%

Pyridoxine

60%

Vitamin B7

6%

Thiamine

9%

Homocystinuria - give vitamin B6 (pyridoxine)

Important for me

Less important

A 67-year-old man presents to the emergency department with lethargy, abdominal pain and polyuria. He underwent a cadaveric renal transplant for end-stage renal disease two months ago. He has a background of type 2 diabetes mellitus and diabetic nephropathy.

Bloods indicate the following:

Na ⁺	135 mmol/l
K ⁺	4.6 mmol/l
Urea	8 mmol/l
Creatinine	110 µmol/l
Corrected Ca ²⁺	3.16 mmol/l
Phosphate	0.6 mmol/l
HbA1C	48 mmol/l
Parathyroid hormone	100 ng/l (reference range 10-65ng/l)

What is the most likely diagnosis?

- ☐ Tertiary hyperparathyroidism
- ☐ Secondary hyperparathyroidism
- ☐ Graft rejection
- ☐ Vitamin D deficiency
- ☐ Poorly controlled diabetes

Tertiary hyperparathyroidism	57%
Secondary hyperparathyroidism	28%
Graft rejection	6%
Vitamin D deficiency	5%
Poorly controlled diabetes	4%

Tertiary hyperparathyroidism is an important differential in hypercalcaemia post renal replacement therapy

Important for me Less important

This is tertiary hyperparathyroidism. Most patients with chronic kidney disease develop a degree of secondary hyperparathyroidism prior to renal transplantation. Secondary hyperparathyroidism is associated with hypo- or normocalcaemia. Following renal replacement therapy, up to half of these patients develop persistent hyperparathyroidism with or without hypercalcaemia, this is termed tertiary hyperparathyroidism. A minority of these patients will become symptomatic.

Graft rejection would not be most likely here, the creatinine is only mildly elevated, other electrolytes are within normal limits. Vitamin D deficiency would not be associated with hypercalcaemia. Diabetic control is good.

A 42-year-old gentleman is admitted to the Emergency Department as a potential stroke. A later CT scan of his head confirms an established infarct and is unfortunately outside the thrombolysis window. During his time in the Emergency Department, you notice a rash in a bathing-suit distribution consistent with angiokeratomas.

Testing your hypothesis, you use a slit-lamp to confirm the presence of corneal whirls.

What is the most likely underlying diagnosis?

- ☐ CADASIL
- ☐ Fabry disease
- ☐ MELAS
- ☐ Primary CNS angiitis
- ☐ Cholesterol embolism

CADASIL	20%
Fabry disease	51%
MELAS	14%
Primary CNS angiitis	6%
Cholesterol embolism	9%

The answer is Fabry disease. This condition typically presents with proteinuria and is associated with early onset strokes or myocardial infarctions with a typical rash known as angiokeratomas.

CADASIL or cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy is an inherited condition which presents with a history of migraines and multiple strokes. It is not associated with angiokeratomas or corneal whorls. MELAS or mitochondrial encephalopathy with lactic acidosis and stroke symptoms is weakened by the absence of lactic acidosis in the stem. There is no evidence of connective tissue disease in the stem to suggest primary CNS angiitis and cholesterol embolism is typically associated with eosinophilia, livedo reticularis and a precipitant such as preceding angiography.

Each one of the following features is seen in phenylketonuria, except:

☐ Learning difficulties

☐ Seizures

☐ Eczema

☐ Recurrent infections

☐ 'Musty' urine

Learning difficulties

10%

Seizures

10%

Eczema

41%

Recurrent infections

31%

'Musty' urine

8%

Dr Assem

Which of the following is most likely to cause hypokalaemia associated with alkalosis?

- ☐ Acetazolamide
- ☐ Partially treated diabetic ketoacidosis
- ☐ Diarrhoea
- ☐ Cushing's syndrome
- ☐ Renal tubular acidosis

Acetazolamide

18%

Partially treated diabetic ketoacidosis

5%

Diarrhoea

29%

Cushing's syndrome

38%

Renal tubular acidosis

10%

Cushing's syndrome causes hypokalaemia with alkalosis

Important for me Less important

A 34-year-old male comes into the GP complaining of haemoptysis. He notes that he wakes up at night due to waking up in a pool of sweat and mentions he recently returned from a holiday in Pakistan. The GP suspects tuberculosis and refers him to a respiratory physician. Which of the following cytokines is primarily responsible for activating macrophages?

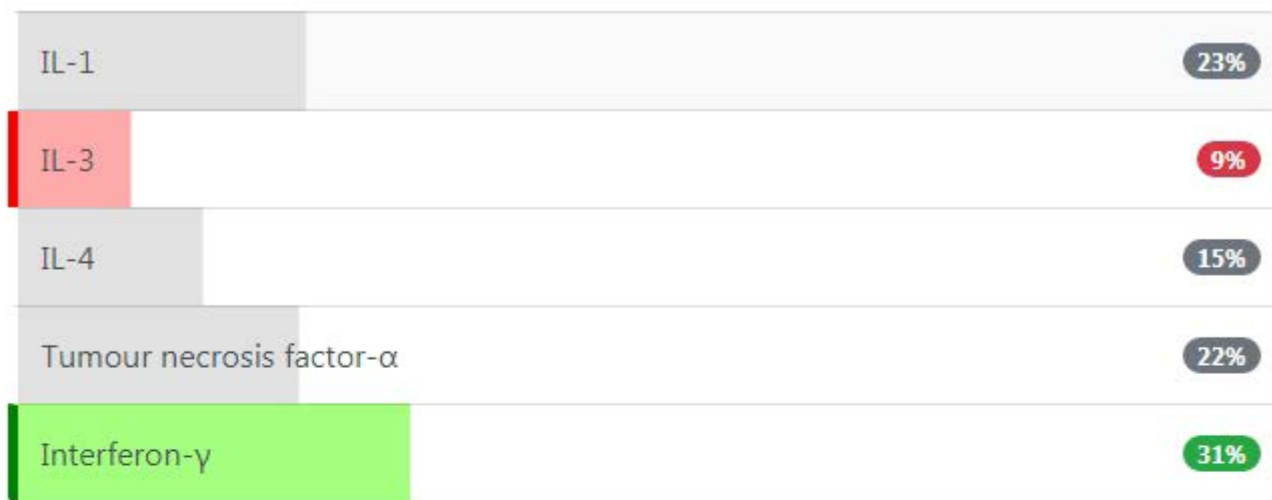
☐ IL-1

☐ IL-3

☐ IL-4

☐ Tumour necrosis factor- α

☐ Interferon- γ



Interferon- γ is responsible for activating macrophages

Important for me [Less important](#)

Interferon- γ is a cytokine released from Th1 cells and is responsible for activating macrophages. Tuberculosis elicits the release of Interferon- γ from T-cells and this is the reason macrophages are tied to its pathology.

IL-2 is secreted from macrophages. IL-3 stimulates the proliferation and differentiation of myeloid progenitor cells. IL-4 is responsible for the proliferation of B cells. Tumour necrosis factor- α is responsible for acute fevers and neutrophil chemotaxis.

In a normal distribution what percentage of values lie within 3 standard deviations of the mean?

☐ 68.3%

☐ 98.3%

☐ 95.4%

☐ 99.7%

☐ 97.2%

68.3%

15%

98.3%

12%

95.4%

14%

99.7%

47%

97.2%

12%

A 43-year-old man visits his GP because he is coughing up green phlegm. He has chest pain on his left-hand side. On examination, crackles can be heard in the base of his left lung. He has bronchial breathing present too. He has reduced chest expansion on his left side too. He has no significant past medical history, except an allergy to penicillin. An x-ray is performed and he is diagnosed with pneumonia. He is started on doxycycline. What is the mechanism of action of doxycycline?

- ☐ Inhibit 50S subunit of ribosomes
- ☐ Inhibit 30S subunit of ribosomes
- ☐ Inhibit protein wall synthesis
- ☐ Inhibit DNA synthesis
- ☐ Inhibit RNA synthesis

Inhibit 50S subunit of ribosomes

23%

Inhibit 30S subunit of ribosomes

46%

Inhibit protein wall synthesis

14%

Inhibit DNA synthesis

11%

Inhibit RNA synthesis

6%

Tetracyclines inhibit the 30S subunit of ribosomes

Important for me Less important

Doxycycline is a tetracycline often prescribed for patients allergic to penicillin and with mild pneumonia. Tetracyclines inhibit the 30S subunit of ribosomes, which leads to an inability of bacteria to produce proteins. Tetracyclines are commonly confused with macrolides, which inhibit the 50S subunit of ribosomes.

Dr Assem

Interferon-alpha may be used in the management of each one of the following, except:

- ☐ Metastatic renal cell cancer
- ☐ Hepatitis B
- ☐ Kaposi's sarcoma
- ☐ Hepatitis C
- ☐ Chronic granulomatous disease

Metastatic renal cell cancer

17%

Hepatitis B

14%

Kaposi's sarcoma

12%

Hepatitis C

13%

Chronic granulomatous disease

44%

You are a ST1 doctor in medicine. A 67-year-old man has been investigated for anaemia and weight loss. Endoscopy shows a gastric tumour which is confirmed as an adenocarcinoma on biopsy. On discussing the diagnosis the patient states that he has had 'a good life' and doesn't want any treatment. Clinical examination is unremarkable. He is able to retain and understand the information you give to him, including the likely curative nature of surgery. What is the most appropriate action?

- Respect his wishes and book a follow-up appointment for four weeks
- Arrange a CT head and check bloods to exclude cerebral metastases and hypercalcaemia
- Arrange an appointment with a psychiatrist
- Detain him under the Mental Health Act
- Ask to speak to his wife alone to find out why he is refusing surgery

Respect his wishes and book a follow-up appointment for four weeks

72%

Arrange a CT head and check bloods to exclude cerebral metastases and hypercalcaemia

8%

Arrange an appointment with a psychiatrist

7%

Detain him under the Mental Health Act

4%

Ask to speak to his wife alone to find out why he is refusing surgery

8%

This question is ultimately about autonomy. By being able to understand and retain the information you give him the patient has demonstrated that he is competent to make decisions. It should be noted that the Mental Capacity Act 2005 states that '*a person is not to be treated as unable to make a decision merely because he makes an unwise decision*'.

A CT head and bloods may exclude causes that would impair judgement but would you override his decision even if you noticed evidence of a cerebral metastase? As there is no evidence that this man is suffering from a mental illness referral to a psychiatrist would be inappropriate.

By speaking to the wife alone you are risking breaching confidentiality. Detaining him under the Mental Health Act simply because you disagree with his decision is clearly wrong

Which one of the following is involved in the degradation of polypeptides?

☐ Peroxisome

☐ Endoplasmic reticulum

☐ Proteasome

☐ Ribosome

☐ Golgi apparatus

Peroxisome

20%

Endoplasmic reticulum

7%

Proteasome

60%

Ribosome

7%

Golgi apparatus

6%

☐ I cells in upper small intestine

☐ G cells in stomach

☐ K cells in upper small intestine

☐ D cells in the pancreas

☐ S cells in upper small intestine

I cells in upper small intestine

58%

G cells in stomach

6%

K cells in upper small intestine

14%

D cells in the pancreas

13%

S cells in upper small intestine

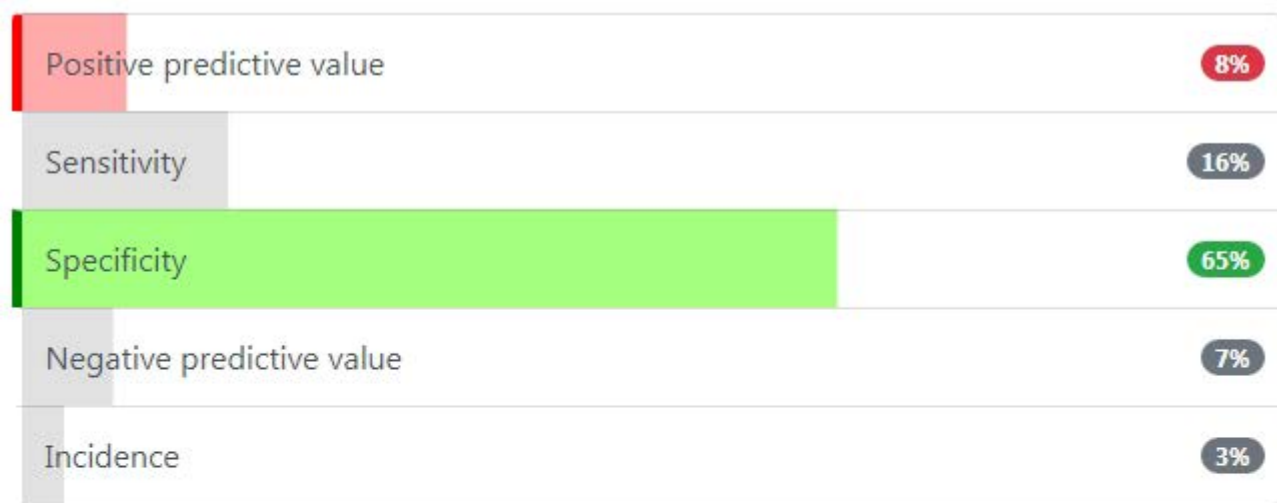
9%

CCK - I cells in upper small intestine

Important for me Less important

Anti-nuclear antibodies (ANA) are commonly found in patients with systemic lupus erythematosus (SLE). However, they can also be found in around 9% of people without the condition. Therefore, as a test for diagnosing SLE, ANA has low:

- ☐ Positive predictive value
- ☐ Sensitivity
- ☐ Specificity
- ☐ Negative predictive value
- ☐ Incidence



If a test is falsely positive in 9% of the general population then that test has poor specificity.

Low specificity tests have many false positives (those without the condition test positive).

Low sensitivity tests have many false negatives (those with the condition are missed).

An 18-year-old female who is known to have Turner's syndrome is referred to cardiology as she has a murmur. On examination a soft ejection systolic murmur is heard. What is the most likely cause of this finding?

- ☐ Coarctation of the aorta
- ☐ Ventricular septal defect
- ☐ Pulmonary stenosis
- ☐ Supravalvular aortic stenosis
- ☐ Bicuspid aortic valve

Coarctation of the aorta

19%

Ventricular septal defect

7%

Pulmonary stenosis

6%

Supravalvular aortic stenosis

10%

Bicuspid aortic valve

58%

Turner's syndrome - most common cardiac defect is bicuspid aortic valve

Important for me Less important

A scientist is developing a new test for Bovine spongiform encephalopathy that uses gel electrophoresis to separate native proteins by 3-D structure. This is an example of:

- ☐ A microarray
- ☐ Polymerase chain reaction
- ☐ Northern blotting
- ☐ Southern blotting
- ☐ Western blotting

A microarray

14%

Polymerase chain reaction

17%

Northern blotting

9%

Southern blotting

9%

Western blotting

52%

Molecular biology techniques

- SNOW (**S**outh - **N**orth - **W**est)
- DROP (**D**NNA - **R**NA - **P**rotein)

Important for me Less important

A study compares the sensitivity of two tests for colorectal cancer. The first test has a sensitivity of 85% whilst the second test has a sensitivity of 91%. What type of significance test should be used for comparing the two results?

- ☐ Wilcoxon matched-pairs
- ☐ Mann-Whitney test
- ☐ Student's t-test
- ☐ Chi-squared test
- ☐ Pearson's test

Wilcoxon matched-pairs

13%

Mann-Whitney test

13%

Student's t-test

20%

Chi-squared test

42%

Pearson's test

12%

As percentages are being compared the chi-squared test should be used

A 52-year-old lady with a 6-month history of steatorrhoea, abdominal pain, bloating and a positive IgA tissue transglutaminase test was referred to gastroenterology for further investigation. The diagnosis is confirmed on duodenal biopsy, which reveals subtotal villous atrophy and crypt hyperplasia.

Which HLA is this disease most associated with?

☐ HLA-DR2

☐ HLA-DR3

☐ HLA-B5

☐ HLA-DQ2

☐ HLA-B27

HLA-DR2	9%
HLA-DR3	15%
HLA-B5	6%
HLA-DQ2	63%
HLA-B27	7%

Coeliac disease is linked to HLA-DQ2

Important for me Less important

This patient has coeliac disease. Coeliac disease is linked to HLA-DQ2 and HLA-DQ8.

HLA-DR2 is associated with narcolepsy and Goodpasture's.

HLA-DR3 is associated with dermatitis herpetiformis, Sjogren's syndrome and primary biliary cirrhosis.

HLA-B5 is associated with Behcet's disease.

HLA-B27 is associated with ankylosing spondylitis, Reiter's syndrome and anterior uveitis.

Northern blotting is used to:

- ☐ Detect and quantify proteins
- ☐ Amplify DNA
- ☐ Detect RNA
- ☐ Detect DNA
- ☐ Amplify RNA

Detect and quantify proteins

8%

Amplify DNA

5%

Detect RNA

65%

Detect DNA

9%

Amplify RNA

13%

Molecular biology techniques

- SNOW (**S**outh - **N**Orth - **W**est)
- DROP (**D**NNA - **R**NA - **P**rotein)

Important for me Less important

A 78-year-old man presented to the eye casualty with diplopia. He has been noticing this double vision for the past two weeks. On examination, there was horizontal diplopia and minimal restriction of one of the extraocular muscles in the left eye. His past medical history includes longstanding prostate cancer and hypertension. Imaging of the brain revealed metastatic lesion in the clivus encasing the cavernous sinus and carotid artery.

Which one of the following cranial nerve palsy leads to diplopia in this patient?

- ☐ Right third cranial nerve (CN3) palsy
- ☐ Left sixth cranial nerve (CN6) palsy
- ☐ Right sixth cranial nerve (CN6) palsy
- ☐ Left fourth cranial nerve (CN4) palsy
- ☐ Left third cranial nerve (CN3) palsy

Right third cranial nerve (CN3) palsy

6%

Left sixth cranial nerve (CN6) palsy

58%

Right sixth cranial nerve (CN6) palsy

11%

Left fourth cranial nerve (CN4) palsy

11%

Left third cranial nerve (CN3) palsy

15%

CN6 palsy manifesting as diplopia could be the first sign of brain metastasis

Important for me [Less important](#)

The sixth cranial nerve (CN6) innervates the lateral rectus muscle which is responsible for moving the eye laterally. CN6 arises from the pons which sits on the clivus. Hence, a tumour involving the clivus would compress the CN6 causing its palsy. This leads to restricted lateral gaze which results in horizontal diplopia as seen in this patient. Right cranial nerve palsies are irrelevant as the question clearly states the involvement of left extraocular muscle. CN4 palsy causes vertical diplopia. CN3 palsy causes ptosis and involves four extraocular muscles rather than one that is mentioned in the question.

A study is designed to see whether the degree of chest pain is linked to the troponin I value for patients admitted following a myocardial infarction. The pain is assessed using a scale of 1-10, with 10 representing the worst pain that the patient has ever experienced. Which one of the following significance tests is it most appropriate to use to investigate this link?

- ☐ Student's t-test
- ☐ Chi-squared test
- ☐ Spearman's rank correlation coefficient
- ☐ Pearson's product-moment coefficient
- ☐ Mann-Whitney test

Student's t-test

17%

Chi-squared test

18%

Spearman's rank correlation coefficient

36%

Pearson's product-moment coefficient

14%

Mann-Whitney test

14%

This scenario looks at whether the values are correlated. As the data is non-parametric, particularly the observation based pain scale, Spearman's rank correlation coefficient should be used.

Dr Assem

You are called to see a patient overnight who had a total parathyroidectomy earlier in the day for primary hyperparathyroidism. The patient is experiencing perioral tingling and leg cramps. The nurse tells you that his hand clenched into a claw when she took his blood pressure. You suspect an electrolyte imbalance. Which ECG finding are you most likely to see with this electrolyte disorder?

- ☐ Tented T waves
- ☐ Flattening of the P wave
- ☐ Prolongation of the QTc interval
- ☐ Prolongation of the QRS interval
- ☐ Torsades de pointes

Tented T waves

6%

Flattening of the P wave

6%

Prolongation of the QTc interval

71%

Prolongation of the QRS interval

10%

Torsades de pointes

7%

The most common ECG change in hypocalcaemia is prolongation of the QTc interval

Important for me Less important

The correct answer is a prolongation of the QTc interval. The patient has the classic symptoms of acute hypocalcaemia. This is common after parathyroidectomy for primary hyperparathyroidism, due to rapid absorption of calcium into the bones after removal of excess PTH (often called 'hungry bones syndrome.') QTc prolongation in hypocalcaemia is mainly due to prolongation of the ST segment as a result of the slowing of ventricular repolarisation.

Torsades de pointes can be seen in hypocalcaemia but it is more commonly seen with hypokalaemia or hypomagnesaemia. Tented T waves and flattening of the P wave are seen in hyperkalaemia.

ECG diagnosis: the effect of ionised serum calcium levels on electrocardiogram

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3951043/>

Dr Assem

A 40-year-old man is admitted with an MI and transferred for an urgent PCI. On closer questioning, he has been complaining of a severe burning sensation of his hands and feet. On examination, you notice multiple angiokeratomas in a bathing-suit distribution. A urine dip reveals protein +++. A diagnosis of Fabry disease is suspected. What is the most likely pathophysiology of the condition?

- ☐ Deficiency of HGPRT
- ☐ Deficiency of TPMT
- ☐ Deficiency of glucocerebrosidase
- ☐ Deficiency of alpha-galactosidase A
- ☐ Deficiency of hexosaminidase A

Deficiency of HGPRT	12%
Deficiency of TPMT	7%
Deficiency of glucocerebrosidase	15%
Deficiency of alpha-galactosidase A	57%
Deficiency of hexosaminidase A	9%

Fabry disease is an X-linked recessive disorder characterised by a deficiency of alpha-galactosidase A.

A deficiency of TPMT is linked with severe bone marrow failure when these patients are given azathioprine or 6-mercaptopurine.

Deficiency of HGPRT and glucocerebrosidase are associated with Lesch-Nyhan syndrome and Gaucher disease respectively. Hexosaminidase A deficiency is linked with Tay-Sachs.

Fabry disease

Fabry disease is an X-linked recessive disorder characterised by the deficiency of alpha-galactosidase A. This leads to accumulation of glycosphingolipids, namely globotriaosylceramide, within the lysosomes of cells. It is the second most prevalent lysosomal storage disorder after Gaucher disease.

Clinical features:

- Severe neuropathic/limb pain brought on by stress, heat, or cold
- Angiokeratomas
- Renal features: proteinuria, polyuria, polydipsia
- Cardiac: left ventricular hypertrophy, coronary artery disease, valvular abnormalities and heart failure
- Cerebrovascular: TIAs/strokes

Management:

- Enzyme replacement therapy with agalsidase alfa

A 40-year-old man is admitted to the intensive care unit following a severe episode of acute pancreatitis. On the third day of his admission he becomes pyrexial. A septic screen is ordered including cultures taken from both peripheral blood and the internal jugular line. There is no signs of infection on the chest x-ray or urine sample. The microbiology laboratory phone to report signs of bacterial infection in the sample from the central line. What is the most likely organism to be isolated?

- ☐ *Pseudomonas aeruginosa*
- ☐ *Escherichia coli*
- ☐ *Staphylococcus epidermidis*
- ☐ *Streptococcus pneumoniae*
- ☐ *Staphylococcus aureus*

Pseudomonas aeruginosa

8%

Escherichia coli

6%

Staphylococcus epidermidis

61%

Streptococcus pneumoniae

2%

Staphylococcus aureus

22%

Most common organism found in central line infections - *Staphylococcus epidermidis*

Important for me Less important

Each of the following organisms commonly cause respiratory tract infections in patients with cystic fibrosis, except:

☐ *Aspergillus*

☐ *Pseudomonas aeruginosa*

☐ *Burkholderia cepacia*

☐ *Staphylococcal aureus*

☐ *Strongyloides stercoralis*

Aspergillus

8%

Pseudomonas aeruginosa

8%

Burkholderia cepacia

11%

Staphylococcal aureus

9%

Strongyloides stercoralis

64%

Which of the following is responsible for the early repolarisation phase of the myocardial action potential?

- ☐ Rapid sodium influx
- ☐ Rapid calcium influx
- ☐ Slow sodium efflux
- ☐ Slow efflux of calcium
- ☐ Efflux of potassium

Rapid sodium influx

19%

Rapid calcium influx

11%

Slow sodium efflux

10%

Slow efflux of calcium

13%

Efflux of potassium

47%

Dr. Assou

A newborn female baby is diagnosed with cystic fibrosis following an episode of meconium ileus shortly after birth. Which one of the following is least likely to occur as a consequence of her underlying diagnosis?

- ☐ Delayed puberty
- ☐ Nasal polyps
- ☐ Diabetes mellitus
- ☐ Rectal prolapse
- ☐ Arthropathy

Delayed puberty

16%

Nasal polyps

12%

Diabetes mellitus

11%

Rectal prolapse

17%

Arthropathy

44%

Arthropathy is not a common feature of cystic fibrosis

Which one of the following cardiac tissue types has the highest conduction velocity?

- ☐ Atrial myocardial tissue
- ☐ Ventricular myocardial tissue
- ☐ Purkinje fibres
- ☐ Atrioventricular node
- ☐ Sinoatrial node

Atrial myocardial tissue

6%

Ventricular myocardial tissue

8%

Purkinje fibres

63%

Atrioventricular node

8%

Sinoatrial node

15%

Which of the following conditions is inherited in an autosomal dominant fashion?

- ☐ Noonan syndrome
- ☐ Homocystinuria
- ☐ Cystinuria
- ☐ Congenital adrenal hyperplasia
- ☐ Fanconi anaemia

Noonan syndrome

45%

Homocystinuria

15%

Cystinuria

8%

Congenital adrenal hyperplasia

22%

Fanconi anaemia

10%

Autosomal recessive conditions are 'metabolic' - exceptions: inherited ataxias

Autosomal dominant conditions are 'structural' - exceptions: Gilbert's, hyperlipidaemia type II

Important for me Less important

A 24-year-old man who has been discharged following admission for a spontaneous pneumothorax ask for advice about flying. During his stay in hospital the pneumothorax was aspirated and a check x-ray revealed no residual air. What is the earliest time he should fly?

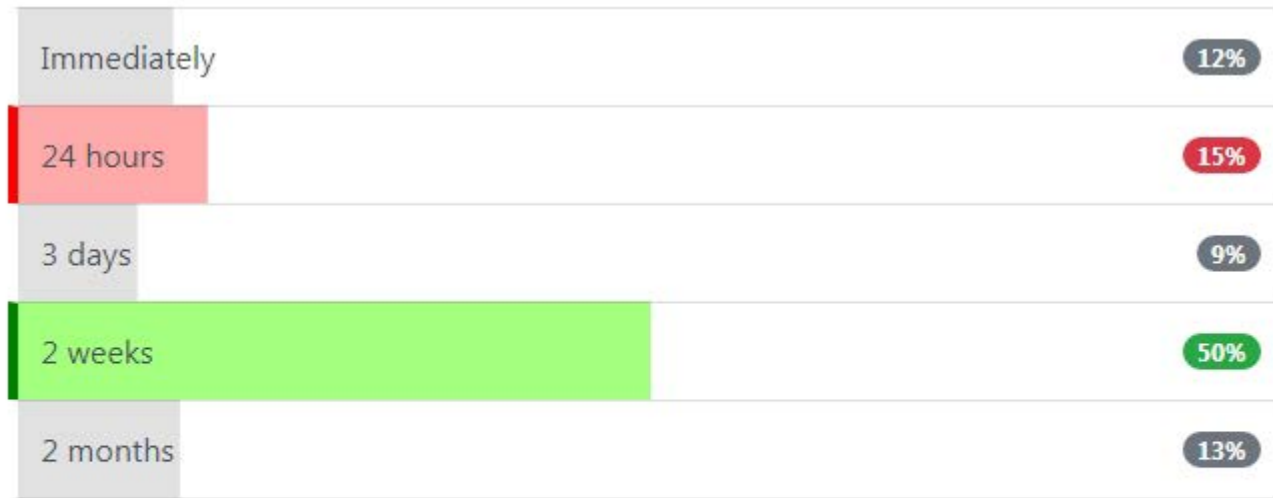
☐ Immediately

☐ 24 hours

☐ 3 days

☐ 2 weeks

☐ 2 months



Please see the text below for an explanation about the competing and changing guidelines.

☐ Type I reaction

☐ Type II reaction

☐ Type III reaction

☐ Type IV reaction

☐ Type V reaction

Type I reaction

5%

Type II reaction

14%

Type III reaction

14%

Type IV reaction

11%

Type V reaction

56%

A 74-year-old female is admitted with central chest pain. She states that the pain comes on with exertion and is relieved by rest. She has a past medical history of hypertension.

ECG results:

ECG	T wave inversion in V4-V6
-----	---------------------------

Blood results:

Troponin I	0.02 ng/ml (normal <0.07)
------------	---------------------------

Which molecule does troponin I bind to?

- ☐ Neuromuscular junction
- ☐ Calcium ions
- ☐ Actin
- ☐ Myosin
- ☐ Sarcoplasmic reticulum

Neuromuscular junction

5%

Calcium ions

11%

Actin

43%

Myosin

34%

Sarcoplasmic reticulum

7%

Troponin I binds to actin to hold the troponin-tropomyosin complex in place

Important for me [Less important](#)

Troponin I binds to actin to hold the troponin-tropomyosin complex in place.

The clinical features are suggestive of stable angina. The T wave inversion in the lateral leads gives further evidence to ischaemic heart disease. The normal troponin I rules out a myocardial infarction.

Cardiac myocytes do not have a neuromuscular junction. They communicate with each other via gap junctions.

Troponin C binds to calcium ions.

Myosin is the thick component of muscle fibres. Actin slides along myosin to generate muscle contraction.

The sarcoplasmic reticulum regulates the calcium ion concentration in the cytoplasm of striated muscle cells

Dr Assem

A 64-year-old woman who is reviewed due to multiple non-healing leg ulcers. She reports feeling generally unwell for many months. Examination findings include a blood pressure of 138/72 mmHg, pulse 90 bpm, pale conjunctivae and poor dentition associated with bleeding gums. What is the most likely underlying diagnosis?

- ☐ Thyrotoxicosis
- ☐ Vitamin B12 deficiency
- ☐ Vitamin C deficiency
- ☐ Diabetes mellitus
- ☐ Sarcoidosis

Thyrotoxicosis

3%

Vitamin B12 deficiency

8%

Vitamin C deficiency

81%

Diabetes mellitus

5%

Sarcoidosis

3%

Dr. Assem

Which one of the following statements regarding gastrin is true?

- ☐ Secreted by D cells in the stomach
- ☐ Secretion is inhibited by high antral pH
- ☐ Reduces acid secretion in the stomach
- ☐ Increases gastric motility
- ☐ Distension of the stomach inhibits secretion

Secreted by D cells in the stomach

12%

Secretion is inhibited by high antral pH

20%

Reduces acid secretion in the stomach

6%

Increases gastric motility

54%

Distension of the stomach inhibits secretion

8%

Gastrin - increases gastric motility

Important for me Less important

Which one of the following is least associated with Tetralogy of Fallot?

- ☐ Right ventricular outflow tract obstruction
- ☐ Overriding aorta
- ☐ Ejection systolic murmur
- ☐ Left-to-right shunt
- ☐ Right ventricular hypertrophy

Right ventricular outflow tract obstruction

15%

Overriding aorta

7%

Ejection systolic murmur

28%

Left-to-right shunt

42%

Right ventricular hypertrophy

9%

Right-to-left shunting is characteristic of Fallot's. It is however known that a small number of asymptomatic infants may initially have a degree of left-to-right shunting through the ventricular septal defect

A 17-year-old male with a history of cystic fibrosis presents to clinic for annual review. What is the most appropriate advice regarding his diet?

- ☐ High calorie and low fat with pancreatic enzyme supplementation for every meal
- ☐ High calorie and low fat with pancreatic enzyme supplementation for evening meal
- ☐ Normal calorie and low fat with pancreatic enzyme supplementation for every meal
- ☐ High calorie and high fat with pancreatic enzyme supplementation for evening meal
- ☐ High calorie and high fat with pancreatic enzyme supplementation for every meal

High calorie and low fat with pancreatic enzyme supplementation for every meal 26%

High calorie and low fat with pancreatic enzyme supplementation for evening meal 9%

Normal calorie and low fat with pancreatic enzyme supplementation for every meal 16%

High calorie and high fat with pancreatic enzyme supplementation for evening meal 12%

High calorie and high fat with pancreatic enzyme supplementation for every meal 37%

Which one of the following causes of primary immunodeficiency is a T-cell disorder?

- ☐ Chediak-Higashi syndrome
- ☐ Chronic granulomatous disease
- ☐ Common variable immunodeficiency
- ☐ DiGeorge syndrome
- ☐ Wiskott-Aldrich syndrome

Chediak-Higashi syndrome

6%

Chronic granulomatous disease

8%

Common variable immunodeficiency

10%

DiGeorge syndrome

66%

Wiskott-Aldrich syndrome

9%

DiGeorge syndrome - a T-cell disorder

Important for me Less important

DiGeorge syndrome is a primary immunodeficiency disorder caused by T-cell deficiency and dysfunction. It is an example of a microdeletion syndrome. Patients are consequently at increased risk of viral and fungal infections.

Which one of the following is not a recognised cause of hypocalcaemia?

- ☐ Hypoparathyroidism
- ☐ Bendroflumethiazide
- ☐ Pseudohypoparathyroidism
- ☐ Acute pancreatitis
- ☐ Acute rhabdomyolysis

Hypoparathyroidism

6%

Bendroflumethiazide

45%

Pseudohypoparathyroidism

15%

Acute pancreatitis

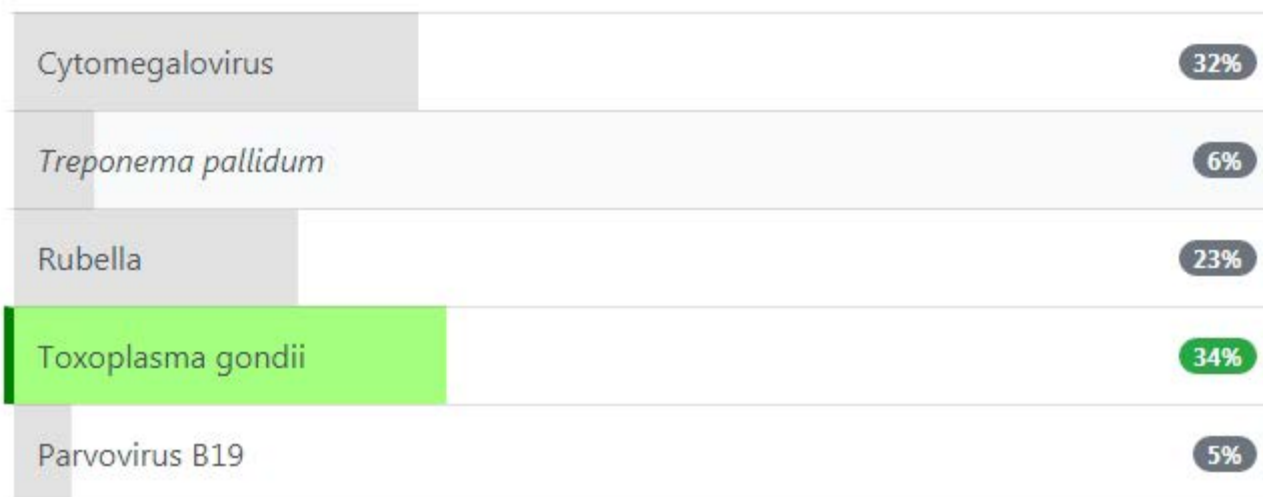
15%

Acute rhabdomyolysis

19%

Which one of the following congenital infections is most characteristically associated with chorioretinitis?

- ☐ Cytomegalovirus
- ☐ *Treponema pallidum*
- ☐ Rubella
- ☐ Toxoplasma gondii
- ☐ Parvovirus B19



Congenital toxoplasmosis

- cerebral calcification
- chorioretinitis

Important for me Less important

A form of 'salt and pepper' chorioretinitis is also seen in congenital rubella but this is not a common feature.

Chorioretinitis is found in around 75% of patients with congenital toxoplasmosis.

Which of the following is true regarding endothelin?

- ☐ It is a potent vasodilator
- ☐ It is produced mainly by pulmonary tissue
- ☐ It acts on target cells by stimulating guanylate cyclase
- ☐ Release is stimulated by nitric oxide
- ☐ Endothelin antagonists are useful in primary pulmonary hypertension

It is a potent vasodilator

21%

It is produced mainly by pulmonary tissue

6%

It acts on target cells by stimulating guanylate cyclase

6%

Release is stimulated by nitric oxide

14%

Endothelin antagonists are useful in primary pulmonary hypertension

53%

Dr. Assem

A 30-year-old man is referred to ophthalmology due to deteriorating visual acuity. Both his brother and uncle on his mother's side have developed similar problems. What is the most likely mode of inheritance of his condition?

- ☐ Autosomal dominant
- ☐ Autosomal recessive
- ☐ X-linked recessive
- ☐ X-linked dominant
- ☐ Polygenic

Autosomal dominant	11%
Autosomal recessive	7%
X-linked recessive	53%
X-linked dominant	25%
Polygenic	4%

This first clue is the nature of the disease - many of the inherited eye disorders such as retinitis pigmentosa and ocular albinism are inherited in an x-linked recessive pattern.

For this disorder to be autosomal recessive both the patient's parents would need to be carriers (heterozygous) as well as both his maternal aunt and uncle. Even for common autosomal recessive disorders such as cystic fibrosis the carrier rate is around 1 in 25 making this statistically less likely.

Which type of secondary messenger system does nitric oxide stimulate?

- ☐ Cyclic GMP
- ☐ Cyclic AMP
- ☐ Phosphoinositide
- ☐ Protein kinase
- ☐ Calcium

Cyclic GMP

52%

Cyclic AMP

30%

Phosphoinositide

8%

Protein kinase

6%

Calcium

5%

Nitric oxide , second messenger = cGMP

Important for me Less important

One of your colleagues confides in you that he has just been diagnosed with hepatitis B. He has not told anyone else as he is worried he may lose his job. He is currently working as a general surgeon in the local hospital. You try to persuade him to inform occupational health but he refuses. What is the most appropriate action?

- ☐ Keep confidentiality but ask him to stop taking blood
- ☐ Send an anonymous letter to his employer
- ☐ Keep confidentiality
- ☐ Inform your colleague's employing body
- ☐ Contact the police

Keep confidentiality but ask him to stop taking blood

10%

Send an anonymous letter to his employer

10%

Keep confidentiality

12%

Inform your colleague's employing body

64%

Contact the police

5%

Whilst this may seem harsh patient safety has to be paramount. Please see the updated GMC guidelines for further details.

A 10-year-old male is referred to an oncologist for suspected lymphoma. His symptoms include fever, night sweats, weight loss and lymphadenopathy is present on examination. Molecular testing and histological analysis of a lymph node biopsy suggest a diagnosis of Burkitt's lymphoma. Which oncogene is associated with Burkitt's lymphoma?

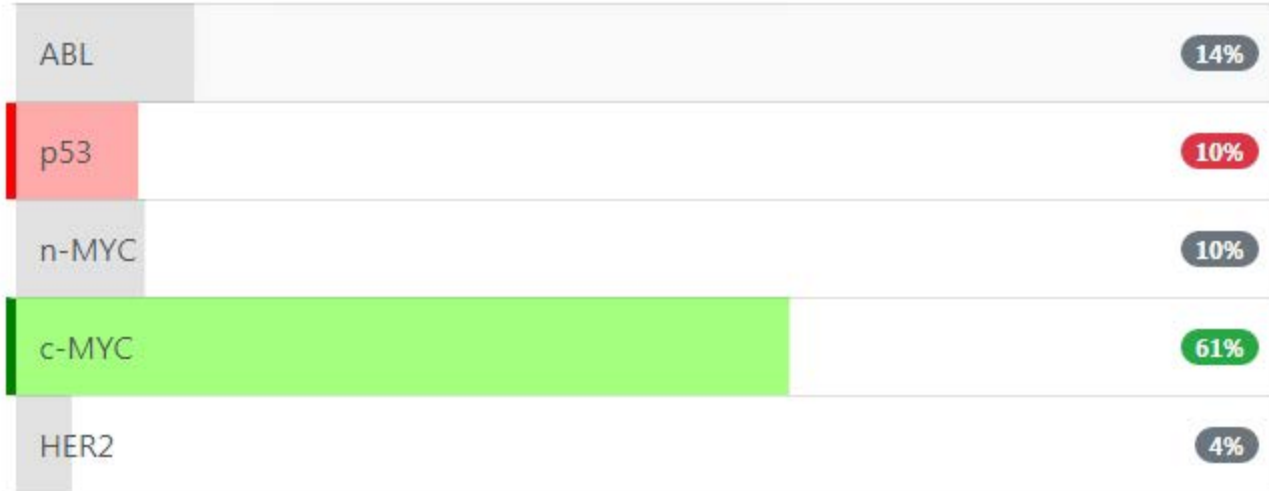
☐ ABL

☐ p53

☐ n-MYC

☐ c-MYC

☐ HER2



Burkitt's lymphoma is commonly associated with c-MYC

Important for me [Less important](#)

Burkitt's lymphoma is classically associated with the translocation: t(8;14). Here, the c-MYC gene is translocated next to the gene for IgH. IgH is highly expressed in the body (as it codes for the heavy chain of antibodies), and this leads to an overamplification c-MYC.

p53 is a tumour suppressor gene, not an oncogene. n-MYC comes from the same family as c-MYC but is found in neuroblastoma. HER2 is found in breast cancer. ABL is found in chronic myeloid leukaemia.

Which one of the following is in direct anatomical contact with the right kidney?

- ☐ Gallbladder
- ☐ Liver
- ☐ Stomach
- ☐ Distal part of small intestine
- ☐ Duodenum

Gallbladder

6%

Liver

23%

Stomach

4%

Distal part of small intestine

16%

Duodenum

51%

Which one of the following may be used to calculate the number needed to treat?

- ☐ $1 / (\text{Absolute risk reduction})$
- ☐ $(\text{Absolute Risk Reduction}) / (\text{Number of people in trial})$
- ☐ $((\text{Control event rate}) - (\text{Experimental event rate})) / (\text{Control event rate})$
- ☐ $1 / (\text{Relative risk})$
- ☐ $1 / (\text{Hazard ratio})$

1 / (Absolute risk reduction)

76%

(Absolute Risk Reduction) / (Number of people in trial)

7%

$((\text{Control event rate}) - (\text{Experimental event rate})) / (\text{Control event rate})$

7%

1 / (Relative risk)

7%

1 / (Hazard ratio)

3%

$\text{NNT} = 1 / \text{Absolute Risk Reduction}$

Important for me

Less important

A scientist is developing an assay whereby he heats up a DNA specimen at 95°C then cools it to 55°C whilst adding primers to specific sequences. Following each primer, heat-stable DNA polymerase is added and the cycle is repeated.

Which molecular technique has been described?

- ☐ Southern blot
- ☐ Western blot
- ☐ SDS-PAGE
- ☐ Polymerase Chain Reaction (PCR)
- ☐ Cloning

Southern blot	18%
Western blot	6%
SDS-PAGE	4%
Polymerase Chain Reaction (PCR)	67%
Cloning	5%

Polymerase Chain Reaction (PCR) uses denaturation, annealing and elongation to amplify a desired fragment of DNA

Important for me [Less important](#)

PCR is a common technique used to amplify a desired fragment of DNA.

Other answers:

- Southern blot: detection of DNA.
- Western blot: detection of RNA
- SDS-PAGE: protein separation by electrophoresis
- Cloning: recombinant DNA production using bacteria

A study is designed to look at the efficacy of a mandible advancement device in reducing snoring. The severity of snoring was assessed by the partner using a 10 point scale before and after using the device. Fifty people were involved in the study. What is the most appropriate statistical test to apply to this data?

- ☐ Unpaired Student's t-test
- ☐ Pearson's product-moment coefficient
- ☐ Wilcoxon signed-rank test
- ☐ Chi-squared test
- ☐ Mann-Whitney test



The data in this study is non-parametric, paired and comes from the same population. These factors make the Wilcoxon signed-rank test the most appropriate statistical hypothesis test to use.

The adrenergic receptor is an example of a:

- ☐ Intracellular receptor
- ☐ Tyrosine kinase receptor
- ☐ Guanylate cyclase receptor
- ☐ G protein-coupled receptor
- ☐ Ligand-gated ion channel

Intracellular receptor

9%

Tyrosine kinase receptor

11%

Guanylate cyclase receptor

18%

G protein-coupled receptor

45%

Ligand-gated ion channel

18%

Norepinephrine - G protein-coupled receptor

Important for me Less important

A 30-year-old male patient is referred by the GP to the infectious disease team with a 10-months history of the gradual appearance of an increasing number of painless nodules on the neck, face and arms. He admits to travelling to India 4 months prior to the appearance of the first nodule. Whilst he was in India, he stayed with a local family for one month, during which he was served meat including pork. On further questioning, he admits that 6 months ago, he noticed passing a noodle-like material in his stool but did not seek medical attention. He also admits to general weight loss for the last 8 months but he has been going to the gym. On examination, there are 10 different subcutaneous nodules in total. The skin biopsy of one of the nodules on the arm shows the nodule to be a white cystic structure.

Given the likely diagnosis, what would be the most appropriate treatment to start him on?

☐ Praziquantel

☐ Bendazoles

☐ Quinine

☐ Penicillin

☐ Flucloxacillin

Praziquantel	30%
Bendazoles	55%
Quinine	6%
Penicillin	5%
Flucloxacillin	4%

Cysticercosis can be treated with bendazoles

Important for me Less important

This patient has disseminated cysticercosis. Cysticercosis can be treated with bendazoles.

Praziquantel is used to treat schistosomiasis.

Quinine is an anti-malarial.

Penicillin and flucloxacillin are not usually used to treat cysticercosis.

A 38-year-old male is admitted to the Emergency Department following a collapse while running a marathon. His blood results are as follows:

Na+	121 mmol/l
K+	3.4 mmol/l
Urea	3.2 mmol/l
Creatinine	68 μ mol/l

During assessment he becomes increasingly obtunded and goes on to have multiple tonic clonic seizures. What is the most appropriate treatment from the list below to improve his neurological status?

- ☐ Decompressive craniotomy
- ☐ Demeclocycline
- ☐ Intravenous normal saline
- ☐ Hypertonic saline
- ☐ Mannitol

Decompressive craniotomy	5%
Demeclocycline	10%
Intravenous normal saline	34%
Hypertonic saline	42%
Mannitol	10%

Acute hyponatraemia is that which occurs within a duration of 48 hours.

Over consumption of fluids, prolonged race duration and inadequate training all can predispose to acute hyponatraemia in this setting. When hyponatraemia develops over a short duration the ability of the brain to adapt is exceeded and cerebral oedema can result which may lead to confusion, seizures and coma. As a result patients may die from brain herniation.

The correct treatment to give is hypertonic saline. Decompressive craniotomy would help alleviate raised intracranial pressure due to cerebral oedema however is not an appropriate first line treatment. Demeclocycline is used for SIADH and mannitol is more likely to be used in the context of traumatic brain injury.

A small, quick increase in the serum sodium is required in order to decrease intracranial pressure. Hypertonic saline (3%) boluses (after seeking senior advice) are the most appropriate treatment to improve neurological status in such patients.

You are reviewing a new study on the benefit of omega-3 fish oils in patients with established ischaemic heart disease. What does the power of the study equate to?

☐ = $1 / p$ value

☐ = standard deviation / square root of sample size

☐ = $1 -$ probability of making a type II error

☐ = $1 -$ probability of making a type I error

☐ = $1 /$ probability of making a type I error

= $1 / p$ value

15%

= standard deviation / square root of sample size

15%

= $1 -$ probability of making a type II error

43%

= $1 -$ probability of making a type I error

16%

= $1 /$ probability of making a type I error

11%

Power = $1 -$ the probability of a type II error

Important for me

Less important

A 34-year-old man is referred to ophthalmology following a deterioration in his vision. He is noted to be tall with thin, long fingers and a degree of learning disabilities. Following review he is suspected as having a displacement of his lens on the right side. What is the most likely underlying diagnosis?

☐ Ehlers-Danlos syndrome

☐ Homocystinuria

☐ Rapadilino syndrome

☐ Marfan's syndrome

☐ Crouzon disease

Ehlers-Danlos syndrome

12%

Homocystinuria

36%

Rapadilino syndrome

4%

Marfan's syndrome

45%

Crouzon disease

3%

The presence of learning difficulties points to a diagnosis of homocystinuria rather than Marfan's syndrome.

You are examining a patient who complains of double vision. Whilst looking forward the patient's left eye turns towards the nose. On looking to the patient's right there is no obvious squint. However, on looking to the left the patient is unable to abduct the left eye and double vision worsens. What is the most likely underlying problem?

- ☐ Right 6th nerve palsy
- ☐ Right 4th nerve palsy
- ☐ Right 3rd nerve palsy
- ☐ Left 6th nerve palsy
- ☐ Left 3rd nerve palsy

Right 6th nerve palsy

7%

Right 4th nerve palsy

6%

Right 3rd nerve palsy

4%

Left 6th nerve palsy

74%

Left 3rd nerve palsy

9%

A 68-year-old man presents to the clinic with his wife. His wife is very concerned about his behaviour during sleep. She states that he appears to be lucidly dreaming and acting out his dreams, which has resulted in him physically hurting her a few times.

What stage of sleep does this phenomenon occur?

- ☐ Awake
- ☐ Non-REM stage 1 (N1)
- ☐ Non-REM stage 2 (N2)
- ☐ Non-REM stage 3 (N3)
- ☐ REM



REM sleep is the deepest stage of sleep which is associated with dreaming and loss of muscle tone

Important for me [Less Important](#)

During the REM stage of sleep there is normally atonia to prevent individuals acting out their dreams. REM sleep behaviour disorders (REM parasomnias) are characterised by loss of this normal atonia during REM sleep. REM sleep is the deepest stage of sleep where dreaming occurs. It is believed that loss of muscle tone during this stage of sleep is partly a protective factor to prevent harm to oneself and others. In REM sleep disorders, the paralysis that normally occurs during REM sleep is incomplete or absent, allowing the person to 'act out' his or her dreams, which are often vivid, intense, and violent.

Non-REM stage 1 (N1) sleep is the lightest sleep which is associated with hypnagogic jerks.

A 4-year-old female is referred to the paediatrician due to a swollen abdomen. She has lost considerable weight and says she is never hungry. Moreover, her bowel movements suggest she is constipated. An MRI reveals a lesion in the adrenal glands. A biopsy of this lesion is taken and undergoes molecular testing for an oncogene. Which of the following is an oncogene for neuroblastoma?

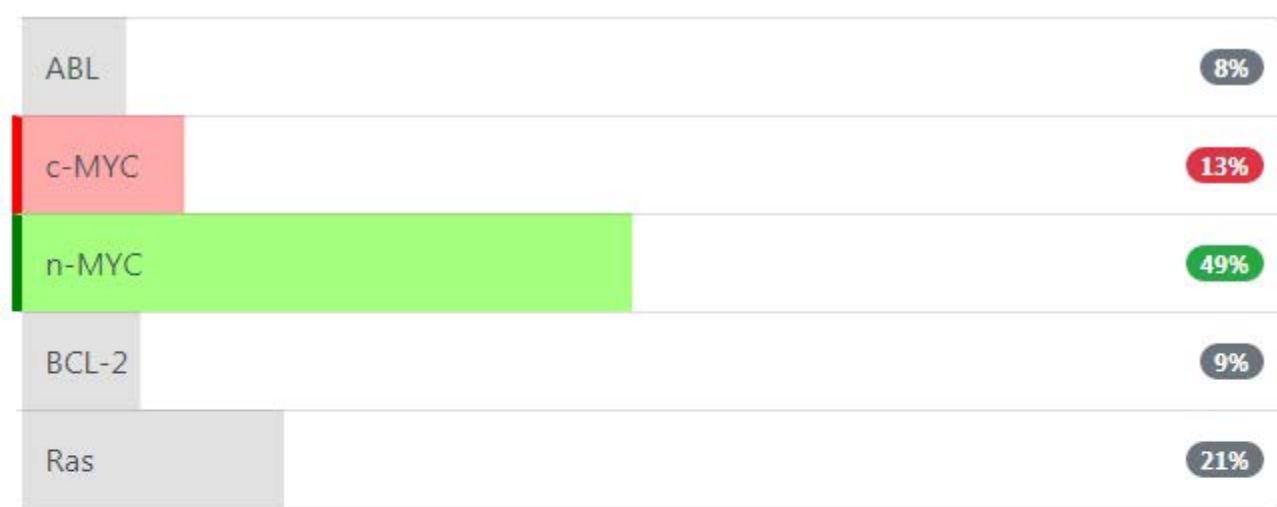
☐ ABL

☐ c-MYC

☐ n-MYC

☐ BCL-2

☐ Ras



n-MYC is an oncogene for neuroblastoma

Important for me [Less important](#)

n-MYC is an oncogene for neuroblastoma. The number of n-MYC repeats often correlates with prognosis. ABL is an oncogene found in chronic myeloid leukaemia. c-MYC is an oncogene found in Burkitt's lymphoma. Ras is an oncogene found in many cancers, but mostly pancreatic cancer.

During which of the following stages of mitosis does chromatin condense to form chromosomes?

☐ Telophase

☐ Metaphase

☐ Prophase

☐ Interphase

☐ Anaphase

Telophase

15%

Metaphase

24%

Prophase

38%

Interphase

11%

Anaphase

13%

Which one of the following defines the standard error of the mean?

Square root (Standard deviation / number of patients)

11%

Number of patients / square root (mean)

7%

Number of patients / square root (standard deviation)

13%

Standard deviation / square root (number of patients)

55%

Standard deviation / square root (mean)

14%

Square root (Standard deviation / number of patients)

11%

Number of patients / square root (mean)

7%

Number of patients / square root (standard deviation)

13%

Standard deviation / square root (number of patients)

55%

Standard deviation / square root (mean)

14%

Standard error of the mean = standard deviation / square root (number of patients)

Important for me Less important

A 4-year-old boy is brought by his mother to the pediatrician. The child has had a diagnosis of cerebral palsy in the past and the mother is aware of this. However, the mother now complains that the child has been hitting himself and biting his fingers over the past few weeks. This behavior has persisted despite the mother giving more attention to the child.

The mother also mentions that her son's stool has been feeling like orange-colored sand. After a blood test revealed a high level of uric acid, the pediatrician explains to the mother that her son most likely suffers from a genetically inherited condition causing a high level of uric acid in the blood. The boy is prescribed allopurinol.

Which of the following best describes the inheritance pattern of this patient's condition?

- ☐ Autosomal recessive
- ☐ X-linked recessive
- ☐ Mitochondrial
- ☐ Autosomal dominant
- ☐ X-linked dominant

Autosomal recessive

39%

X-linked recessive

33%

Mitochondrial

14%

Autosomal dominant

7%

X-linked dominant

7%

Lesch-Nyhan syndrome causing hyperuricemia is genetically inherited in an X-linked recessive pattern

Important for me Less important

This patient presented with the signs and symptoms typical of Lesch-Nyhan syndrome. This disease, also known as juvenile gout, is characterized by hyperuricemia. It is a genetic condition with an X-linked pattern of inheritance. It is caused by a defect in the purine salvage pathway due to the absence of the hypoxanthine-guanine phosphoribosyltransferase (HGPRT) enzyme which catalyzes the conversion of hypoxanthine to inosine monophosphate (IMP) and guanine to guanosine monophosphate (GMP). The consequence is an accumulation of uric acid. The typical findings supporting this diagnosis in this patient is the aggressive behavior, self-mutilation, intellectual impairment as well as laboratory finding of hyperuricemia. Other conditions with an X-linked recessive pattern of inheritance are Becker muscular dystrophy, Fabry's disease and G6PD deficiency amongst others. (First Aid 2017, p34&55-57).

1: Autosomal recessive pattern of inheritance is common for conditions featuring enzyme, carrier channels and other biomolecular deficiencies such as glycogen storage diseases, phenylketonuria and Wilson disease. For an autosomal recessive condition to be passed on to an offspring, both the father and mother must be carriers and the child has a 25 percent chance of developing the condition by inheriting two copies of the defective gene.

3: Mitochondrial inheritance depicts conditions transmitted by defective mitochondria. Since mitochondria are passed on from mother to offspring, these conditions are always inherited maternally. Examples are the mitochondrial myopathies such as the mitochondrial encephalopathy, lactic acidosis, and stroke-like episodes (MELAS) syndrome.

4: Autosomal dominant pattern of inheritance is common for conditions featuring defect in structural genes. Examples are conditions such as Marfan syndrome, Li Fraumeni syndrome and Von Hippel-Lindau disease. For autosomal dominant conditions, the passing of only one copy of the defective gene from either the mother or the father is sufficient for expression of the disease.

5: X-linked dominant pattern of inheritance is usually passed on from both mothers and fathers to their offspring. Since mothers have two copies of the X chromosome, they can pass it to 50 percent of their daughters and sons. However, fathers who have only one copy of the X chromosome will pass it to all their daughters and not to their sons. Examples of the conditions with this pattern of inheritance are fragile X syndrome and hypophosphatemic rickets.

A study looks at whether golf actually increases the risk of medial epicondylitis. Sixty people who regularly play golf are matched to sixty people who do not play golf. Thirty of the golfers had developed medial epicondylitis at some point compared to ten of the non-golfers.

What is the odds ratio of developing medial epicondylitis for people who play golf?

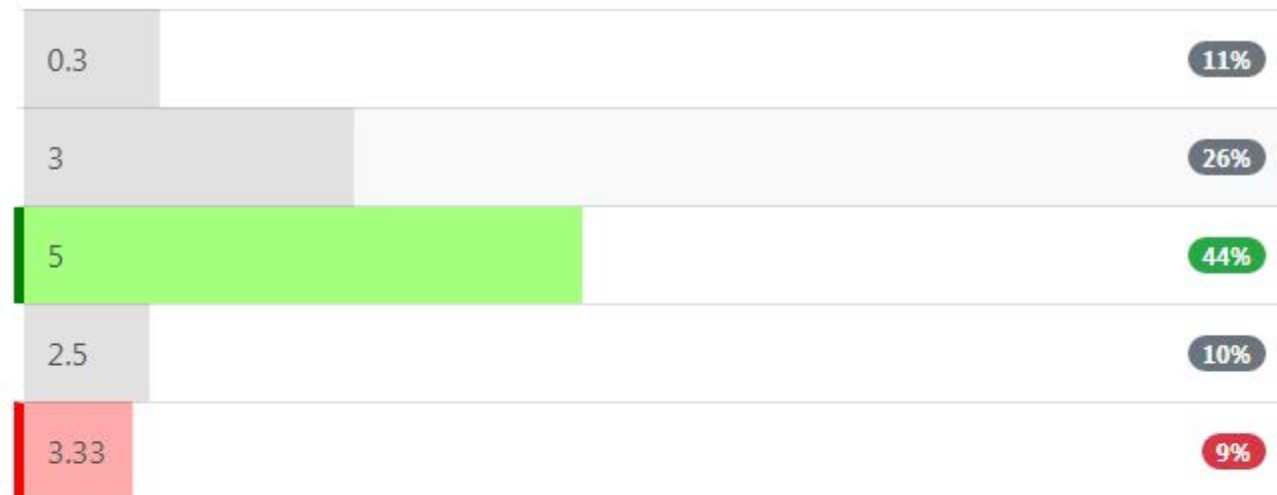
☐ 0.3

☐ 3

☐ 5

☐ 2.5

☐ 3.33



Remember to **calculate the odds, rather than risk**, initially:

Odds of a golfer developing medial epicondylitis = $30 / 30 = 1$. If we were calculating the *risk*, rather than the odds that is asked for, it would be $30 / 60 = 0.5$.

Odds a non-golfer developing medial epicondylitis = $10 / 50 = 0.2$. Again, the *risk* would be $10/60 = 0.16$.

The odds ratio is therefore = $1 / 0.2 = 5$

Which one of the following diseases is most strongly associated with HLA antigen DR2?

- ☐ Haemochromatosis
- ☐ Type 1 diabetes mellitus
- ☐ Goodpasture's syndrome
- ☐ Behcet's disease
- ☐ Coeliac disease

Haemochromatosis

11%

Type 1 diabetes mellitus

14%

Goodpasture's syndrome

50%

Behcet's disease

11%

Coeliac disease

15%

Goodpasture's - HLA-DR2

Important for me Less important

A new anti-epileptic drug is trialled for children with absence seizures. There are 250 children in the control group and 150 children assigned to take the new drug. After 4 months 100 children in the control group had had a seizure compared to 15 children in the group taking the new medication. What is the relative risk reduction?

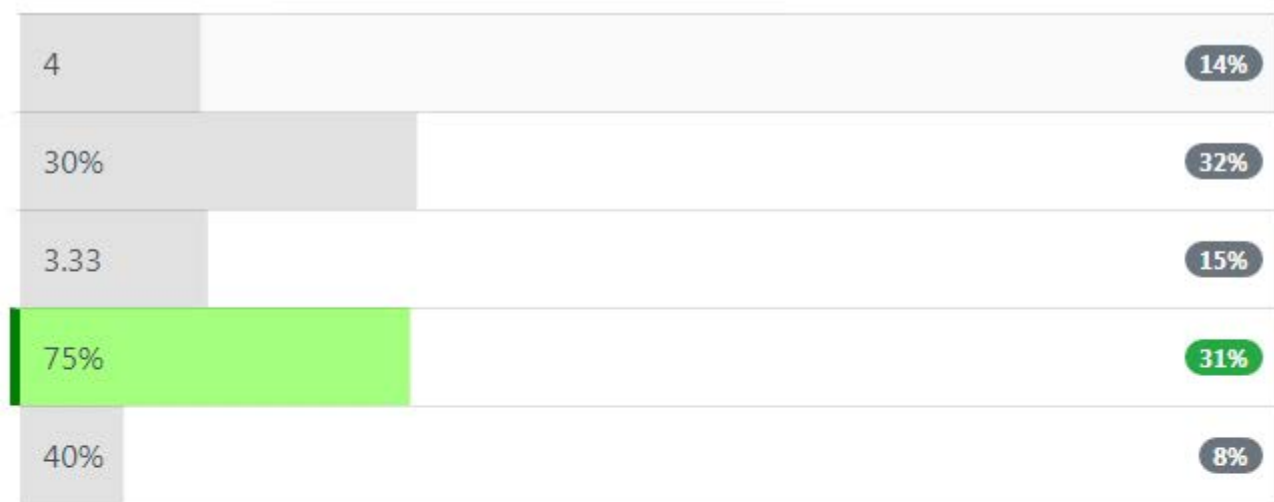
☐ 4

☐ 30%

☐ 3.33

☐ 75%

☐ 40%



Relative risk reduction = $(\text{EER} - \text{CER}) / \text{CER}$

Important for me Less important

Experimental event rate, $\text{EER} = 15 / 150 = 0.1$

Control event rate, $\text{CER} = 100 / 250 = 0.4$

Relative risk reduction = $(\text{EER} - \text{CER}) / \text{CER} = (0.1 - 0.4) / 0.4 = -0.75$ or a 75% reduction

Which one of the following statements regarding epidemiological measures is correct?

- ☐ Cross-sectional surveys can be used to estimate the prevalence of a condition in the population
- ☐ In chronic diseases the incidence is much greater than the prevalence
- ☐ Incidence = prevalence * duration of condition
- ☐ The prevalence is the number of new cases per population in a given time period
- ☐ Pre-test probability = 1 / incidence

Cross-sectional surveys can be used to estimate the prevalence of a condition in the population

56%

In chronic diseases the incidence is much greater than the prevalence

7%

Incidence = prevalence * duration of condition

11%

The prevalence is the number of new cases per population in a given time period

17%

Pre-test probability = $1 / \text{incidence}$

9%

A 61-year-old man is seen in clinic due to numbness and tingling in his left hand. On examination he has weakness of elbow extension, metacarpophalangeal joint flexion and extension and distal interphalangeal joint flexion with all other movements preserved, all reflexes are normal and sensation is normal apart from reduced pin-prick sensation over the medial aspect of the hand. An MRI scan of the cervical spine is performed as a nerve lesion is suspected.

Which of the following pathologies is most likely to be found on the scan based on the clinical findings?

- ☐ Disc herniation between C5 and C6
- ☐ Disc herniation between C6 and C7
- ☐ Disc herniation between C7 and T1
- ☐ Facet joint hypertrophy between C6 and C7
- ☐ Facet joint hypertrophy between C7 and T1

Disc herniation between C5 and C6	15%
Disc herniation between C6 and C7	25%
Disc herniation between C7 and T1	38%
Facet joint hypertrophy between C6 and C7	10%
Facet joint hypertrophy between C7 and T1	11%

C8 is the **ONLY** cervical nerve root that comes out **BELOW** the vertebra

Important for me Less important

The scenario describes someone with a C8 radiculopathy evidenced by reduced sensation in the C8 dermatome (the medial side of the hand over the little finger) and weakness of the C8 myotome (flexion of the distal interphalangeal and metacarpophalangeal joints). The other options available correspond to the C6 or C7 roots and these are unaffected as evidenced by normal elbow flexion and thumb sensation (C6) and normal sensation over the middle finger (C7). Elbow extension is weak as it has roots from both C7 and C8 and so cannot be used alone to decide between the two levels clinically.

The C8 nerve root exits the spine below the C7 vertebra, being the only cervical nerve root which exits below a vertebra. The rest of the cervical nerve roots derive their name from the vertebra below them. The most common acute pathology causing a radiculopathy is a disc herniation and therefore this is the correct answer.

An elderly patient is admitted to hospital following blood in her urine and severe abdominal pain. She has a blood pressure of 90/60 and a heart rate of 140bpm. Her respiratory rate is 30 breaths per minute with oxygen sats at 90%. She is started on high-flow oxygen, given antibiotics and a fluid bolus. Moreover, blood cultures, lactate and urine output are measured. Over the next 10 minutes, her heart rate and blood pressure stabilise. Her family are told that she is most likely suffering from sepsis secondary to a urinary tract infection. Which cytokine is responsible for the chemotaxis of neutrophils?

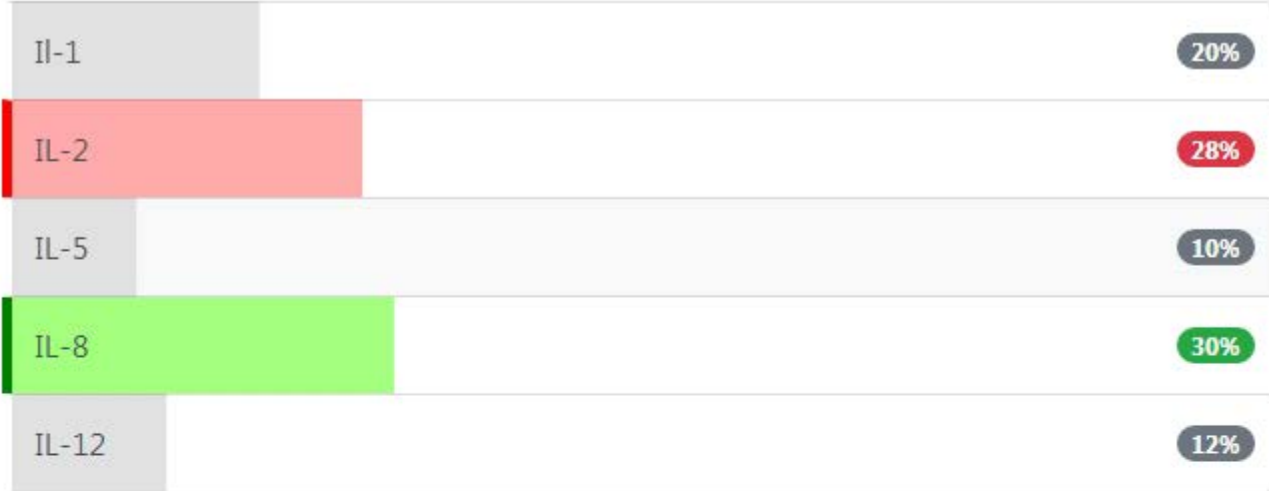
☐ IL-1

☐ IL-2

☐ IL-5

☐ IL-8

☐ IL-12



IL-8 - main functions include: neutrophil chemotaxis

Important for me Less important

IL-8 is responsible for the chemotaxis of neutrophils. It is secreted from macrophages and some epithelial tissues.

IL-1 is responsible for acute inflammation. IL-2 is secreted from Th1 cells and is responsible for proliferation and differentiation of T cells. IL-5 stimulates proliferation of eosinophils. IL-12 is secreted from antigen presenting cells and encourages the differentiation of Th0 cells into Th1 cells.

You review a 29-year-old woman who is recovering from a fracture of the right olecranon. Since the fracture she has noticed that the little finger on her right hand is numb. Which nerve is likely to have been damaged?

- ☐ Ulnar nerve
- ☐ Radial nerve
- ☐ Axillary nerve
- ☐ Musculocutaneous nerve
- ☐ Median nerve

Ulnar nerve

74%

Radial nerve

7%

Axillary nerve

4%

Musculocutaneous nerve

5%

Median nerve

9%

Which one of the following best describes the Bohr effect?

- ☐ Increase in pO_2 means CO_2 binds less well to Hb
- ☐ Decreasing acidity (or pCO_2) means oxygen binds less well to Hb
- ☐ Decrease in pO_2 means CO_2 binds less well to Hb
- ☐ Raised 2,3-DPG enhances oxygen delivery to the tissues
- ☐ Increasing acidity (or pCO_2) means oxygen binds less well to Hb

Increase in pO_2 means CO_2 binds less well to Hb

15%

Decreasing acidity (or pCO_2) means oxygen binds less well to Hb

12%

Decrease in pO_2 means CO_2 binds less well to Hb

7%

Raised 2,3-DPG enhances oxygen delivery to the tissues

17%

Increasing acidity (or pCO_2) means oxygen binds less well to Hb

48%

A 32-year-old man presents to the sexual health clinic with a painful ulcer on his penis. On further questioning, he also admits to having experiencing recurrent ulcers in the mouth and joint pains in his elbows and knee. On examination, there is a small ulcer, about 2 cm in diameter, on the glans of penis.

Which HLA antigen is associated with this presentation?

- ☐ HLA B5
- ☐ HLA DR3
- ☐ HLA DR4
- ☐ HLA A3
- ☐ HLA DQ8

HLA B5

57%

HLA DR3

16%

HLA DR4

12%

HLA A3

5%

HLA DQ8

9%

Behcet's disease is associated with HLA-B5

Important for me Less important

The patient presents with features (oral, genital ulcers and arthritis) which are suggestive of Behcet's disease. Another feature of Behcet's disease is eye inflammation such as anterior uveitis. Behcet's disease is associated with HLA-B5.

HLA DR3 is associated with Sjogren's syndrome and primary biliary cirrhosis.

HLA DR4 is associated with rheumatoid arthritis and type 1 diabetes mellitus.

HLA A3 is associated with haemochromatosis.

HLA DQ8 is associated with coeliac disease.

Dr Assem

Which one of the following would invalidate the use of the Student's t-test when performing a significance test?

- ☐ Using it with unpaired data
- ☐ Using it with data that is not normally distributed
- ☐ Using it with data that has a small sample size
- ☐ Using it to test whether the slope of a regression line differs significantly from 0
- ☐ Using it to test a null hypothesis

Using it with unpaired data

18%

Using it with data that is not normally distributed

46%

Using it with data that has a small sample size

11%

Using it to test whether the slope of a regression line differs significantly from 0

12%

Using it to test a null hypothesis

13%

Data must be parametric, i.e. follows a normal distribution

A 64-year-old female patient is referred to the gastroenterology clinic with a 6-month history of recurrent epigastric pain, acid reflux unresponsive to antacids and a trial of proton-pump inhibitor. Gastrosocopy is arranged which shows an ulcer in the descending duodenum and a tumour in the antrum of the stomach.

Which type of cell this does this tumour originates from?

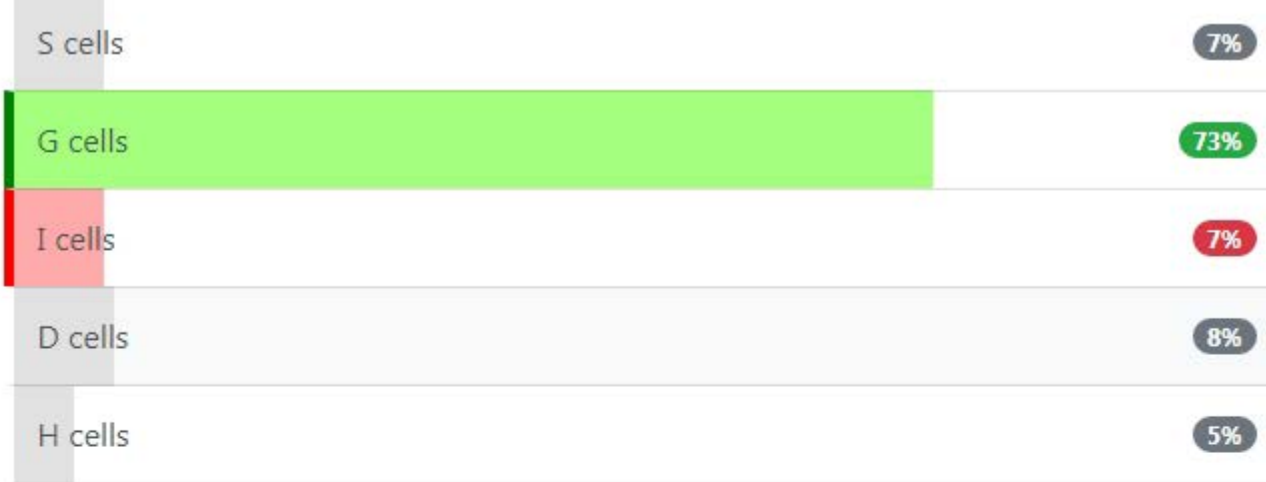
☐ S cells

☐ G cells

☐ I cells

☐ D cells

☐ H cells



Gastrin is produced by the G cells in the antrum of the stomach

Important for me Less important

The tumour in this patient is most likely a gastrinoma. Gastrinoma secretes excessive gastrin which causes increased HCL production, resulting in peptic ulcers. Gastrin is usually produced by the G cells in the antrum of the stomach.

S cells secrete secretin.

I cells secrete CCK.

D cells secrete somatostatin.

There is no such cell as H cell in the stomach.

You are a ST1 doctor on a gastroenterology ward. The F2 doctor has asked you to supervise him putting in an ascitic drain for a patient with liver cirrhosis. He is keen to get it signed off for his portfolio. He has never seen one put in before but has read around the subject. What is the most appropriate action?

- ☐ You do the procedure but sign him off as you know he will do many more over the next 3 months
- ☐ Get the F2 doctor to insert the drain under your careful guidance, avoid telling the patient to prevent unnecessary anxiety
- ☐ Suggest it would be better if he watches you insert the drain before attempting one himself
- ☐ If he is confident ask him to do it so you can spend your time more efficiently on other ward jobs and sign him off
- ☐ Ask the patient if he minds the F2 doctor doing the procedure and get the F2 doctor to insert the drain under your careful guidance

You do the procedure but sign him off as you know he will do many more over the next 3 months

4%

Get the F2 doctor to insert the drain under your careful guidance, avoid telling the patient to prevent unnecessary anxiety

6%

Suggest it would be better if he watches you insert the drain before attempting one himself

66%

If he is confident ask him to do it so you can spend your time more efficiently on other ward jobs and sign him off

5%

Ask the patient if he minds the F2 doctor doing the procedure and get the F2 doctor to insert the drain under your careful guidance

19%

It used to be said that for procedures 'see one, do one, teach one'. These days have long gone. Doctors are now expected to show proof of competency before performing procedures alone. In this scenario the F2 doctor has never seen one previously so it is not appropriate for him to insert the drain today. The best option is for him to watch you.

If you are going to let the F2 doctor insert the drain you should be honest with the patient about his lack of experience.

Signing him off without seeing him perform the procedure is a very poor option which could result in a GMC referral if found out. It also puts future patients at risk

Letting him insert the drain today without supervision is again a very poor option as it puts the patient at risk.

Dr Assem

A 47-year-old male visits the GP for review and a routine blood check. He has a past medical history of angina, hypertension, asthma and hyperlipidaemia. You look to his medications which shows an extensive polypharmacy including fenofibrate. This drug lowers triglyceride levels and increases high-density lipoprotein (HDL) synthesis.

What is the mechanism of this drug?

- ☐ Inhibition of hepatic diacylglycerol acyltransferase-2
- ☐ HMG-CoA reductase inhibitor
- ☐ Activation of PPAR receptor resulting in increase lipoprotein lipase (LPL) activity
- ☐ Reduction in the reabsorption of bile acids
- ☐ Increased production of apolipoprotein E by the liver

Inhibition of hepatic diacylglycerol acyltransferase-2

10%

HMG-CoA reductase inhibitor

8%

Activation of PPAR receptor resulting in increase lipoprotein lipase (LPL) activity

61%

Reduction in the reabsorption of bile acids

14%

Increased production of apolipoprotein E by the liver

7%

Fibrates work through activating PPAR alpha receptors resulting in an increase in LPL activity reducing triglyceride levels

Important for me [Less important](#)

Fibrates are cholesterol-lowering drugs that work through activating PPAR alpha receptors resulting in an increase in LPL activity. LPL increases the uptake of triglyceride fatty acids in muscles resulting in lower levels in the blood.

Statins inhibit HMG-CoA reductase resulting in the reduction of the mevalonate pathway leading to reduced cholesterol levels.

Niacin or nicotinic acid (vitamin B3) inhibits hepatic diacylglycerol acyltransferase-2 which is required for triglyceride synthesis.

Bile acid sequestrants are a class of drugs which work by binding to bile salts reducing reabsorption of bile acids.

Apolipoprotein E is a protein involved in the metabolism of fats it specifically removes chylomicron remnants.

A 16-year-old girl attends your GP surgery due to concerns about delayed menarche. On history, you note that there have been no developmental concerns. She is at the 65th percentile for weight and 5th percentile for height. On examination, you note that she has a short webbed neck and a broad chest. You perform karyotype analysis, which is abnormal. What is the most common cardiac condition associated with this presentation?

- ☐ Bicuspid aortic valve
- ☐ Patent ductus arteriosus
- ☐ Atrioventricular septal defect
- ☐ Mitral valve prolapse
- ☐ Tricuspid regurgitation

Bicuspid aortic valve

68%

Patent ductus arteriosus

8%

Atrioventricular septal defect

9%

Mitral valve prolapse

10%

Tricuspid regurgitation

6%

Turner's syndrome - most common cardiac defect is bicuspid aortic valve

Important for me Less important

Turner syndrome (45 XO) is associated with:

- Bicuspid aortic valve
- Aortic root dilatation
- Coarctation of the aorta

Dr Assem

A 62-year-old man presents to the cardiology clinic for review some 6 weeks after suffering an anterior myocardial infarction. His medication has been optimised, his blood pressure is 122/82 mmHg, pulse is 67 beats per minute and regular. LDL cholesterol is 1.4 mmol/l, hsCRP is 15mg/l.

Which of the following medications has been shown to impact on future risk of myocardial infarction in patients like this?

- ☐ Canakinumab
- ☐ Prednisolone
- ☐ Infliximab
- ☐ Rituximab
- ☐ Methotrexate

Canakinumab	42%
Prednisolone	16%
Infliximab	13%
Rituximab	14%
Methotrexate	15%

Modulating inflammation can reduce ischaemic cardiovascular events

Important for me Less important

Canakinumab is an anti-IL1 monoclonal antibody, which has been shown to reduce systemic inflammation. In patients who have an elevated CRP of $>2\text{mg/l}$, (as here), patients in the CANTOS trial who had suffered a previous MI were treated with canakinumab. Those patients treated with canakinumab in addition to standard of care had a 15% reduction in major adverse cardiovascular events versus those treated with standard of care alone. This trial has established 'proof of concept' for modulating inflammation in those patients at increased risk of cardiovascular disease.

<https://www.nejm.org/doi/full/10.1056/NEJMoa1707914?query=OF>

There is some evidence that use of anti-TNF agents used in the treatment of rheumatic disease may be associated with reduced incidence of cardiovascular events, although this is from post-hoc statistical analyses. Infliximab is therefore not the correct answer here. There is no evidence of cardiovascular benefit from any of the other agents listed, (prednisolone, rituximab or methotrexate).

Which one of the following immunoglobulins are present in the lowest concentration in blood?

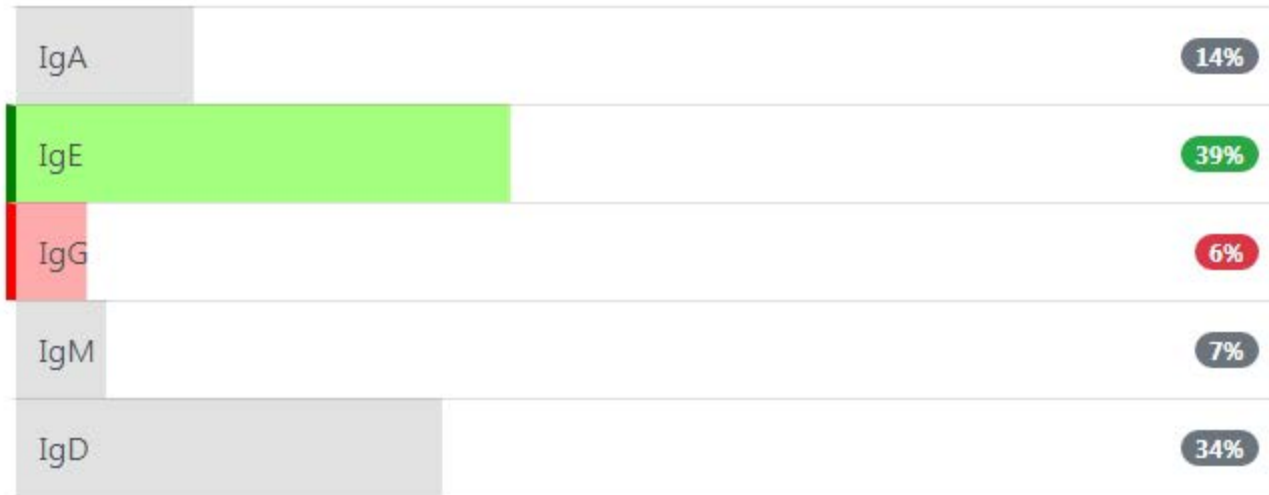
☐ IgA

☐ IgE

☐ IgG

☐ IgM

☐ IgD



Whilst the majority of IgA is found in secretions there is a significant quantity present in blood. IgE makes up less than 0.1% of immunoglobulins

Which one of the following conditions is NOT an autosomal dominant condition?

☐ Retinoblastoma

☐ Tuberose sclerosis

☐ Achondroplasia

☐ Myotonic dystrophy

☐ Albinism

Retinoblastoma

11%

Tuberose sclerosis

8%

Achondroplasia

10%

Myotonic dystrophy

14%

Albinism

58%

Autosomal recessive conditions are 'metabolic' - exceptions: inherited ataxias

Autosomal dominant conditions are 'structural' - exceptions: Gilbert's, hyperlipidaemia type II

Important for me Less important

Which one of the following statements regarding galactosaemia is **incorrect**?

- ☐ Autosomal recessive inheritance
- ☐ May cause cataracts
- ☐ Caused by the absence of galactose-1-phosphate uridyl transferase
- ☐ May cause jaundice
- ☐ May cause peripheral neuropathy

Autosomal recessive inheritance

13%

May cause cataracts

10%

Caused by the absence of galactose-1-phosphate uridyl transferase

16%

May cause jaundice

22%

May cause peripheral neuropathy

38%

Dr. S. S. S. S.

You are speaking to a 24-year-old man who is known to have haemophilia A. His wife has had genetic testing and was found not to be a carrier of haemophilia. He asks you what the chances are of his future children developing haemophilia. What is the correct answer?

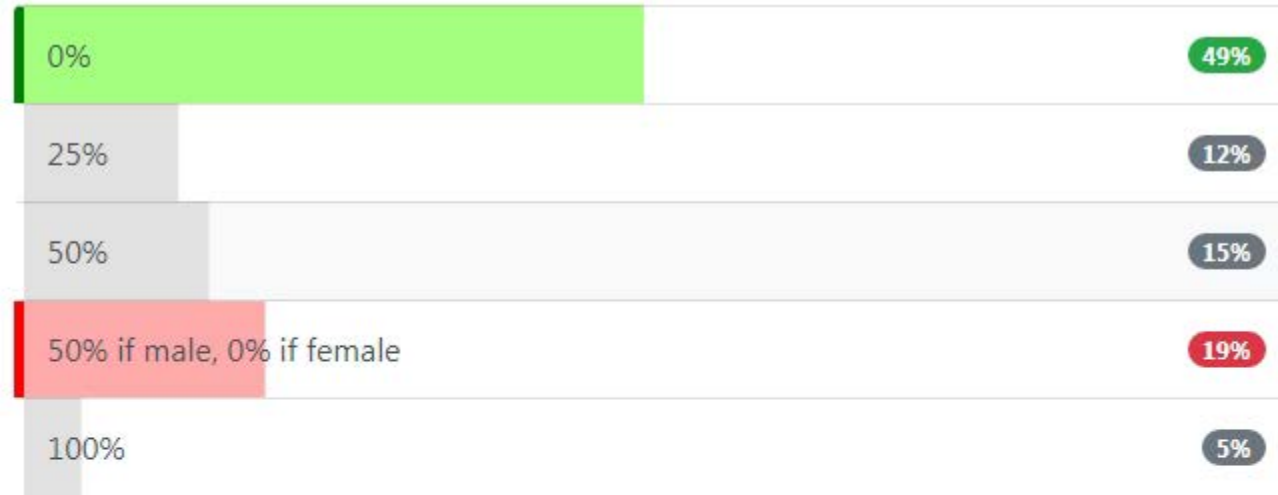
☐ 0%

☐ 25%

☐ 50%

☐ 50% if male, 0% if female

☐ 100%



X-linked recessive conditions - there is no male-to-male transmission. Affected males can only have unaffected sons and carrier daughters.

Important for me Less important

As we now know that mother is not a carrier of the disease there is no chance that any future children could develop haemophilia. You should of course also discuss with him that any daughters that he has will be carriers of the condition.

A 23-year-old man is referred to the ophthalmologists with visual problems which are found to be caused by a downward dislocation of the lens in his right eye. The ophthalmologist notices his marfanoid habitus and history of learning disabilities. A diagnosis of homocystinuria is suspected. What is the pathophysiology of this condition?

- ☐ Deficiency of S-adenosyl-methionine
- ☐ Deficiency of homocysteine transsulfurase
- ☐ Excess of cystathionine beta synthase
- ☐ Deficiency of cystathionine beta synthase
- ☐ Excess of homocysteine transsulfurase

Deficiency of S-adenosyl-methionine

8%

Deficiency of homocysteine transsulfurase

25%

Excess of cystathionine beta synthase

9%

Deficiency of cystathionine beta synthase

49%

Excess of homocysteine transsulfurase

9%

Homocystinuria is caused by a deficiency of cystathionine beta synthase

Important for me

Less important

Interestingly, patients with Down's syndrome have an excess of cystathionine beta synthase.

Dr Assem

A randomised controlled trial compares two drugs used in the initial management of rheumatoid arthritis. After being assigned to the randomised groups a number of patients drop out due to adverse effects of the medication. How should the data be analysed?

- ☐ Recruit more patients
- ☐ For each patient who drops out, remove a patient from the other randomised group
- ☐ Include the patients who drop out in the final data set
- ☐ Remove patients who drop out from final data set
- ☐ Abandon the trial if more than 5% of patients drop out

Recruit more patients

6%

For each patient who drops out, remove a patient from the other randomised group

11%

Include the patients who drop out in the final data set

52%

Remove patients who drop out from final data set

18%

Abandon the trial if more than 5% of patients drop out

13%

An 82-year-old male nursing home resident with advanced vascular dementia presents with worsening confusion to the Emergency Department. His only regular medication is clopidogrel. His admission blood tests are as follows:

Na+	121 mmol/l
K+	3.8 mmol/l
Urea	9.4 mmol/l
Creatinine	110 umol/l

His confusion screen (including CT brain) is normal. On examination he has dry mucous membranes, his blood pressure is 104/58 mmHg, pulse 94/min and temperature 36.1°C. With regard to his low sodium what would be the most appropriate management?

- ☐ Fluid restriction
- ☐ Demeclocycline
- ☐ Intravenous normal saline
- ☐ Tolvaptan
- ☐ Furosemide

Fluid restriction	17%
Demeclocycline	8%
Intravenous normal saline	65%
Tolvaptan	6%
Furosemide	4%

This case is an example of hypovolaemic hyponatraemia. It is important with hyponatraemia to ascertain volume status as this will determine management. Poor oral intake due to advancing dementia is the likely cause. This is supported by an elevated urea suggesting dehydration. Poor oral intake can lead to both hyper or hyponatraemia depending on the relative proportions of sodium and water deficiency.

The management of each is as follows:

Hypovolaemic hyponatraemia

- rehydration with sodium chloride 0.9% or a balanced crystalloid (Hartmann's)
- avoid rapid correction of sodium in order to reduce the risk of osmotic complications such as central pontine myelinolysis

Euvolaemic hyponatraemia

- check urine and serum osmolality. Does the patient meet the criteria for SIADH?
- treat the underlying cause where possible in SIADH
- fluid restriction (500-750mls/day)
- monitor fluid balance and perform daily weights
- consider demeclocycline or tolvaptan (under specialist supervision). Both inhibit the action of antidiuretic hormone.

Hypervolaemic hyponatraemia

- fluid and salt restriction
- consider diuretics
- treat the underlying cause (e.g. cardiac failure)

A case-control study is designed to investigate whether being exposed to passive smoking as a child is a risk factor for asthma. Two hundred patients with asthma are recruited. Of these 200, 40 report either one or both parents smoking in the house when they were a child. A further 200 controls who do not have asthma are recruited. Of these people 20 report that one or both parents smoked in the house. What is the odds ratio of asthmatics having been exposed to passive smoking as a child?

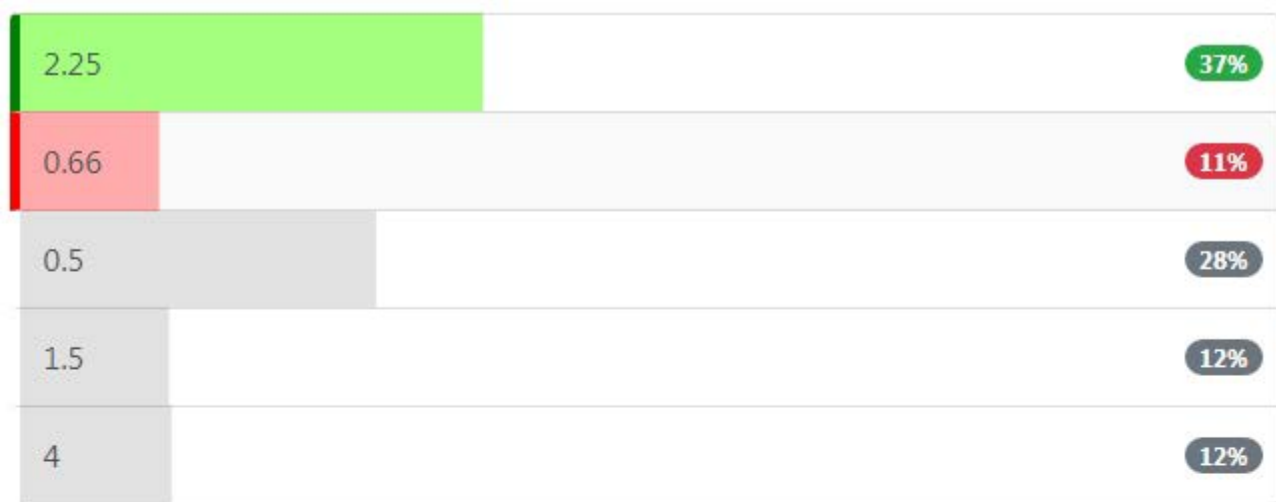
☐ 2.25

☐ 0.66

☐ 0.5

☐ 1.5

☐ 4



Odds - remember a ratio of the number of people who incur a particular outcome to the number of people who do not incur the outcome

NOT a ratio of the number of people who incur a particular outcome to the total number of people

Important for me Less important

The odds of asthmatics being exposed to passive smoking is $40 / 160 = 1 / 4$

The odds of the controls being exposed to passive smoking is $20 / 180 = 1 / 9$

The odds ratio is therefore $1/4 / 1/9 = 9/4 = 2.25$

Which one of the following diseases is most strongly associated with HLA antigen DR2?

- ☐ Behcet's disease
- ☐ Type 1 diabetes mellitus
- ☐ Coeliac disease
- ☐ Haemochromatosis
- ☐ Narcolepsy

Behcet's disease

13%

Type 1 diabetes mellitus

18%

Coeliac disease

22%

Haemochromatosis

10%

Narcolepsy

36%

Narcolepsy - HLA-DR2

Important for me Less Important

Which one of the following statements regarding relative risk is correct?

- ☐ Relative risk = 1 - absolute risk reduction
- ☐ It is the usual outcome measure of cohort studies
- ☐ Risk may be defined as the odds of an outcome happening
- ☐ Relative risk = 1 / odds ratio
- ☐ If the risk ratio is less than 1 then the rate of an event is increased compared to controls

Relative risk = 1 - absolute risk reduction

21%

It is the usual outcome measure of cohort studies

36%

Risk may be defined as the odds of an outcome happening

13%

Relative risk = 1 / odds ratio

21%

If the risk ratio is less than 1 then the rate of an event is increased compared to controls

9%

Remember that risk and odds are different. If 20 patients die out of every 100 who have a myocardial infarction then the risk of dying is $20 / 100 = 0.2$ whereas the odds are $20 / 80 = 0.25$.

A 22-year-old male university student presents to the GP surgery with a 2-week history of a patch of red and flaky skin at the corners of the mouth. On examination, angular cheilitis is evident. On further questioning, he reports that for the last 3-4 months he has been drinking alcohol excessively and not eating well.

What is the most likely vitamin deficiency to cause this clinical picture?

- ☐ Vitamin B2 (riboflavin) deficiency
- ☐ Vitamin B6 deficiency
- ☐ Vitamin D deficiency
- ☐ Vitamin A deficiency
- ☐ Vitamin K deficiency

Vitamin B2 (riboflavin) deficiency	49%
Vitamin B6 deficiency	38%
Vitamin D deficiency	3%
Vitamin A deficiency	6%
Vitamin K deficiency	4%

Riboflavin deficiency causes angular cheilitis

Important for me Less important

Vitamin B2 (riboflavin) deficiency is a cause of angular cheilitis. 3-4 months of inadequate intake of riboflavin is sufficient to lead to depletion and becoming symptomatic.

Vitamin B6 deficiency causes peripheral neuropathy.

Vitamin D deficiency causes osteomalacia.

Vitamin A deficiency causes visual deterioration and night blindness.

Vitamin K deficiency causes easy bruising and bleeding.

A 60 year-old man with haemophilia A has just become a grandfather. He wants to know what the chances are of his daughter's son having haemophilia. His daughter's partner is well with no past medical history.

What is the probability that his daughter's son has haemophilia A?

- ☐ Impossible to calculate
- ☐ 50%
- ☐ 25%
- ☐ No increased risk
- ☐ 100%

Impossible to calculate

8%

50%

43%

25%

22%

No increased risk

20%

100%

7%

Haemophilia A is an X-linked recessive disease. This means that all female offspring of affected men will be carriers. There is then a 50% chance of these females passing the gene on. If the female's children are male, they will therefore have a 50% chance of having the condition.

Which of the following is responsible for the plateau phase of the myocardial action potential?

- ☐ Slow calcium efflux
- ☐ Efflux of potassium
- ☐ Rapid sodium influx
- ☐ Slow influx of calcium
- ☐ Slow sodium efflux



Slow influx of calcium is responsible for the plateau phase of the action potential

The serum potassium is measured in a 1,000 patients taking an ACE inhibitors. The mean potassium is 4.6 mmol/l with a standard deviation of 0.3 mmol/l. Which one of the following statements is correct?

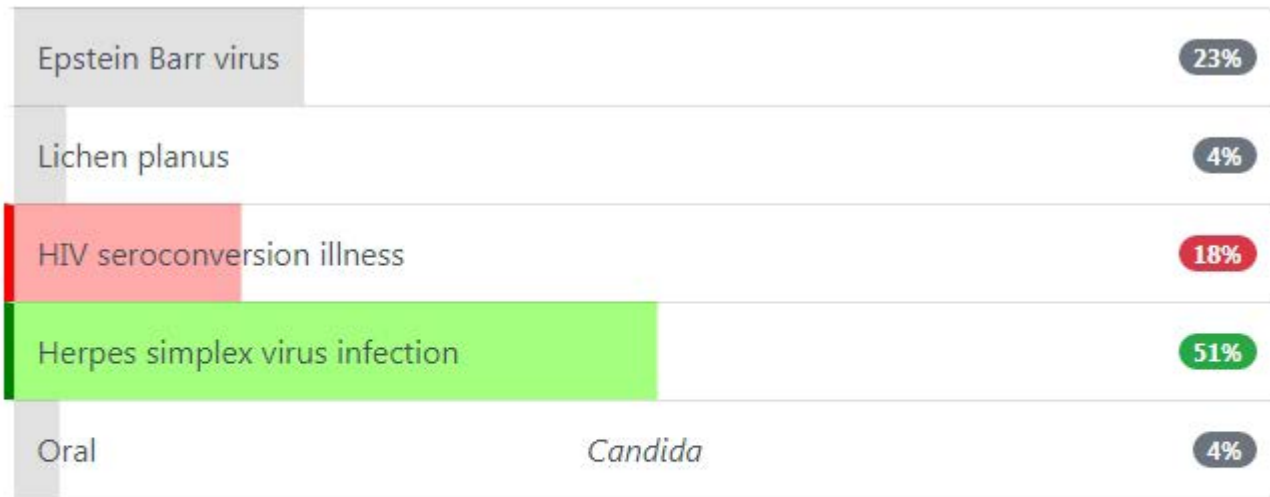
- ☐ 95% of values lie between 4.5 and 4.75 mmol/l
- ☐ 95.4% of values lie between 4.3 and 4.9 mmol/l
- ☐ 99.7% of values lie between 4.0 and 5.2 mmol/l
- ☐ 68.3% of values lie between 4.5 and 4.75 mmol/l
- ☐ 68.3% of values lie between 4.3 and 4.9 mmol/l

95% of values lie between 4.5 and 4.75 mmol/l	15%
95.4% of values lie between 4.3 and 4.9 mmol/l	22%
99.7% of values lie between 4.0 and 5.2 mmol/l	19%
68.3% of values lie between 4.5 and 4.75 mmol/l	15%
68.3% of values lie between 4.3 and 4.9 mmol/l	29%

We know that 68.3% of values of a normally distributed variable lie within 1 standard deviation of the mean. This means the range is 4.3 to 4.9 mmol/l.

A 23-year-old man presents with a three day history of general malaise and low-grade temperature. Yesterday he developed extensive painful ulceration of his mouth and gums. On examination his temperature is 37.4°C, pulse 84 / min and there is submandibular lymphadenopathy. What is the most likely diagnosis?

- ☐ Epstein Barr virus
- ☐ Lichen planus
- ☐ HIV seroconversion illness
- ☐ Herpes simplex virus infection
- ☐ Oral *Candida*



This man has gingivostomatitis, a characteristic feature of primary herpes simplex virus infection

Which one of the following conditions is usually inherited in a X-linked dominant fashion?

Albinism

11%

Hurler's syndrome

11%

Ataxia telangiectasia

18%

Homocystinuria

13%

Alport's syndrome

46%

Albinism

11%

Hurler's syndrome

11%

Ataxia telangiectasia

18%

Homocystinuria

13%

Alport's syndrome

46%

Alport's syndrome is inherited in a X-linked dominant fashion in around 85% of cases

A 55-year-old woman complains of neck and right arm pain for the past two months. The pain is often triggered by flexing her neck. Her past medical history includes osteoarthritis of her knee, obesity and depression. On examination there is no obvious muscle atrophy or weakness of the right arm. There is however some sensory loss over the middle finger and palm of the hand. Which nerve root is most likely to be affected by the impingement?

☐ C4

☐ C5

☐ C6

☐ C7

☐ C8

C4

5%

C5

9%

C6

19%

C7

57%

C8

10%

A scientist is studying the role of regulatory proteins in intracellular trafficking. He has isolated and identified various intracellular proteins tagged with extensive ubiquitination.

These proteins are destined to which of the following organelles?

☐ Smooth endoplasmic reticulum

☐ Rough endoplasmic reticulum

☐ Golgi apparatus

☐ Proteasome

☐ Peroxisome

Smooth endoplasmic reticulum

10%

Rough endoplasmic reticulum

18%

Golgi apparatus

23%

Proteasome

36%

Peroxisome

13%

Ubiquitin tagging destines proteins to proteasome for degradation

Important for me

Less important

Ubiquitin tags proteins for degradation in proteasome and lysosome.

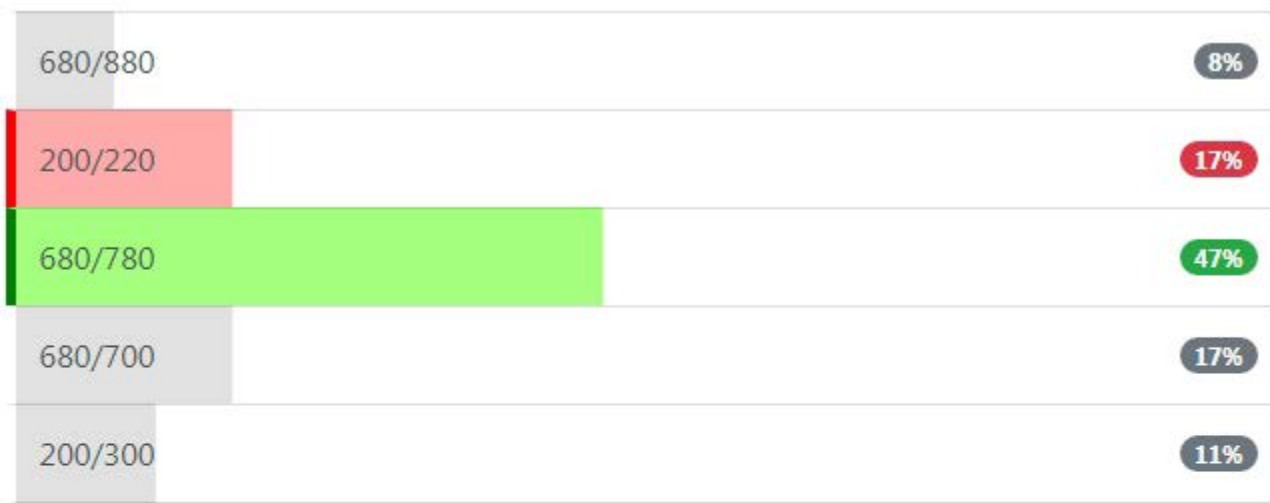
Dr Assem

A rapid finger-prick blood test to help diagnosis deep vein thrombosis is developed. Comparing the test to current standard techniques a study is done on 1,000 patients:

	DVT present	DVT absent
New test positive	200	100
New test negative	20	680

What is the specificity of the new test?

- ☐ 680/880
- ☐ 200/220
- ☐ 680/780
- ☐ 680/700
- ☐ 200/300



$$\text{Specificity} = \text{TN} / (\text{TN} + \text{FP})$$

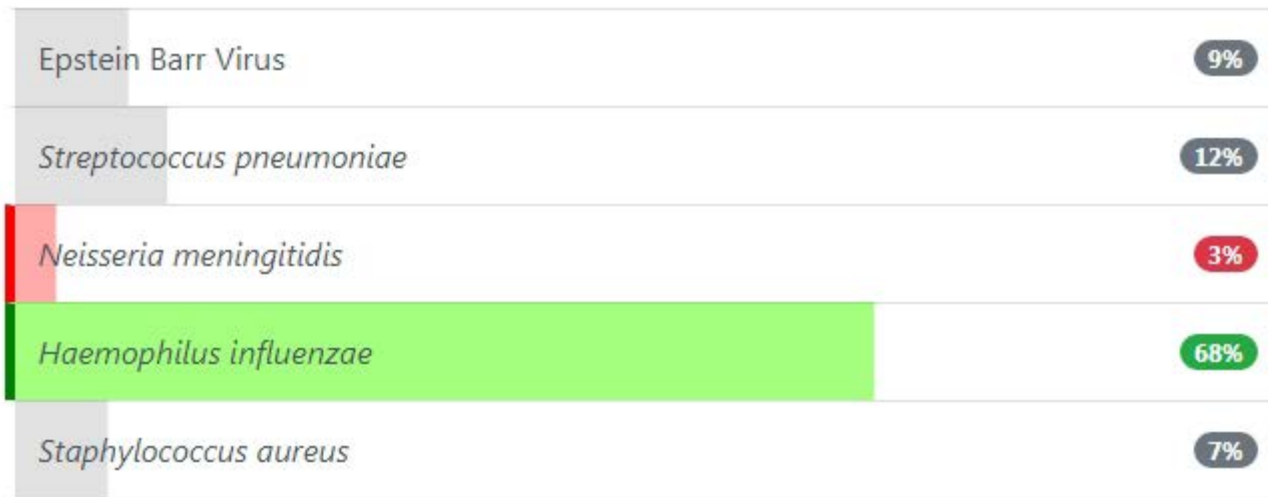
Important for me Less important

Specificity = true negatives / (true negatives + false positives)

$$= 680 / (680 + 100)$$

A 19-year-old man from a travelling community presents to the Emergency Department with breathing difficulties. On examination he has a temperature of 38.2°C and stridor. A diagnosis of acute epiglottitis is suspected. Which one of the following organisms is most likely to be responsible?

- ☐ Epstein Barr Virus
- ☐ *Streptococcus pneumoniae*
- ☐ *Neisseria meningitidis*
- ☐ *Haemophilus influenzae*
- ☐ *Staphylococcus aureus*



Acute epiglottitis is caused by *Haemophilus influenzae* type B

Important for me Less important

Patients from travelling communities may not always receive a full course of immunisation.

Acute epiglottitis is of course much more common in young children

Dr Assem

A study is performed comparing two chemotherapy regimes for patients with small cell lung cancer. The end point of the study is survival time. Which one of the following types statistical measures is it most appropriate to compare survival time with?

- ☐ Odds ratio
- ☐ Pearson's product-moment coefficient
- ☐ Relative risk
- ☐ Hazard ratio
- ☐ Absolute risk reduction

Odds ratio

16%

Pearson's product-moment coefficient

22%

Relative risk

17%

Hazard ratio

27%

Absolute risk reduction

18%

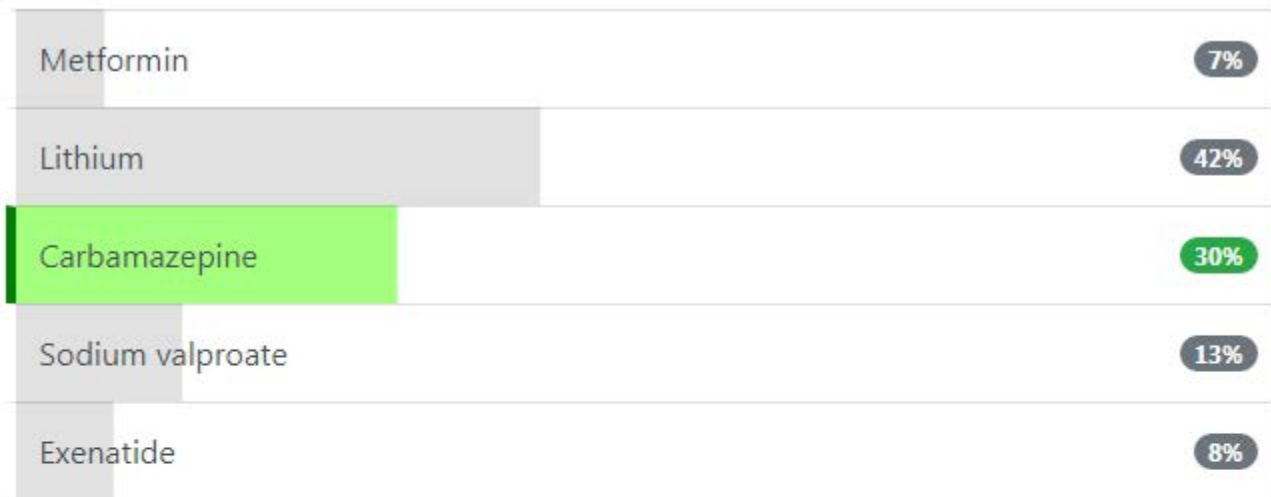
Dr Assem

A 55-year-old man with a history of type 2 diabetes mellitus, bipolar disorder and chronic obstructive pulmonary disease has bloods taken as part of his annual diabetic review:

Na ⁺	129 mmol/l
K ⁺	3.8 mmol/l
Bicarbonate	24 mmol/l
Urea	3.7 mmol/l
Creatinine	92 µmol/l

Due to his smoking history a chest x-ray is ordered which is reported as normal. Which one of the following medications is most likely to be responsible?

- ☐ Metformin
- ☐ Lithium
- ☐ Carbamazepine
- ☐ Sodium valproate
- ☐ Exenatide



SIADH - drug causes: carbamazepine, sulfonylureas, SSRIs, tricyclics

Important for me Less important

Lithium can cause diabetes insipidus but this is generally associated with a high sodium. Lithium only tends to cause raised antidiuretic hormone levels following a severe overdose. Please see the BNF for more details.

Which one of the following drugs is contra-indicated whilst breast feeding?

- ☐ Aminophylline
- ☐ Carbamazepine
- ☐ Sodium valproate
- ☐ Methyldopa
- ☐ Amiodarone

Aminophylline

11%

Carbamazepine

12%

Sodium valproate

21%

Methyldopa

7%

Amiodarone

49%

Amiodarone in breastfeeding must be avoided

Important for me Less important

Which one of the following immunological changes is seen in progressive HIV infection?

- ☐ Increase in IL-2 production
- ☐ Increase in B2-microglobulin levels
- ☐ Increased type IV hypersensitivity responses
- ☐ Increased natural killer (NK) cell function
- ☐ A rise in the CD4/CD8 ratio

Increase in IL-2 production

16%

Increase in B2-microglobulin levels

30%

Increased type IV hypersensitivity responses

13%

Increased natural killer (NK) cell function

16%

A rise in the CD4/CD8 ratio

25%

You review a 30-year-old man shortly after he is discharged from the Intensive Care Unit after being admitted with pneumococcal pneumonia. This is his second admission in 18 months with a severe pneumonia. During his first admission *Haemophilus influenzae* was grown from his sputum. He also describes having frequent episodes of sinusitis and recurrent skin abscesses. Which one of the following complement deficiencies is he most likely to be suffering from?

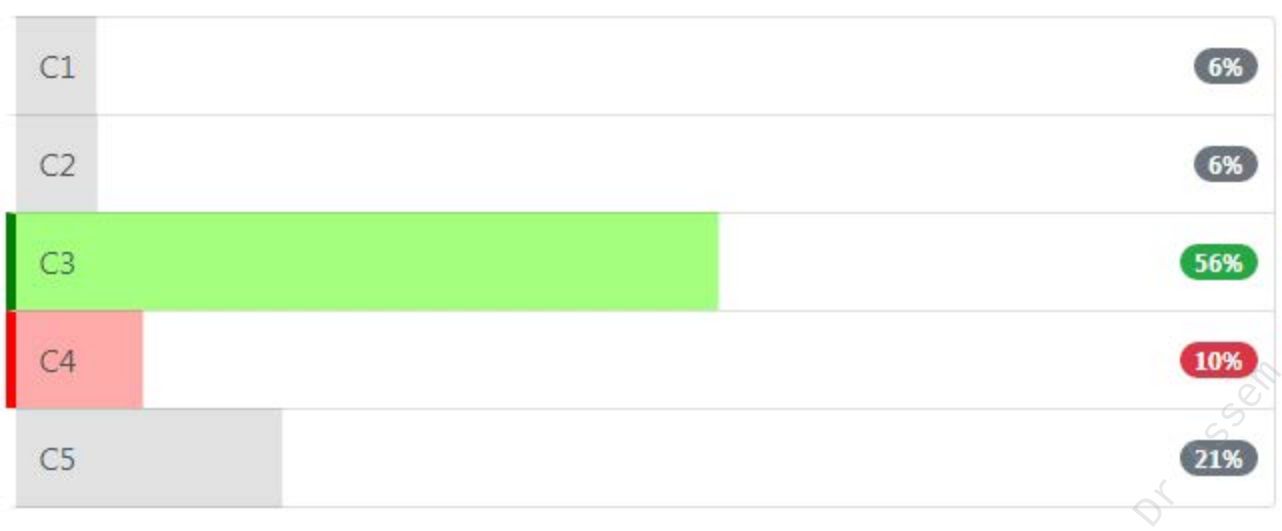
☐ C1

☐ C2

☐ C3

☐ C4

☐ C5



A 45-year-old man presents to his GP with a severe sore throat and difficulty swallowing. He is found to have oesophageal candidiasis and an HIV test returns as positive. The medical student attached to the GP practice asks the GP about the HIV virus. Which of the following is correct?

- ☐ HIV is a DNA virus
- ☐ HIV 2 is more pathogenic than HIV 1
- ☐ HIV is an RNA virus
- ☐ HIV leads to depletion of B cells
- ☐ HIV enters the cells using the CD3 receptor

HIV is a DNA virus

11%

HIV 2 is more pathogenic than HIV 1

6%

HIV is an RNA virus

72%

HIV leads to depletion of B cells

5%

HIV enters the cells using the CD3 receptor

6%

HIV is an RNA retrovirus

Important for me Less important

The correct answer is 3 - HIV is an RNA virus in the retrovirus class. It uses a reverse transcriptase to convert its RNA genome into DNA, which it then integrates into the host cell genome.

The other answers are incorrect. HIV 2 is less pathogenic than HIV 1. HIV leads to depletion of T cells. HIV enters the cell primarily via the CD4 receptor.

NICE CKS: HIV infection and AIDS

<https://cks.nice.org.uk/hiv-infection-and-aids>

Dr Assem

Which one of the following statements is true regarding interferon?

- ☐ Interferon-beta is produced by leucocytes
- ☐ Interferon-alpha and interferon-beta bind to the same type of receptor
- ☐ Interferon-gamma has stronger antiviral action than interferon-alpha
- ☐ Interferon-alpha has been shown to reduce the frequency of exacerbations in patients with relapsing-remitting multiple sclerosis
- ☐ Interferon-gamma has a role in chronic hepatitis C

Interferon-beta is produced by leucocytes

14%

Interferon-alpha and interferon-beta bind to the same type of receptor

30%

Interferon-gamma has stronger antiviral action than interferon-alpha

15%

Interferon-alpha has been shown to reduce the frequency of exacerbations in patients with relapsing-remitting multiple sclerosis

23%

Interferon-gamma has a role in chronic hepatitis C

18%

A 20-year-old Chinese woman, who came to the UK on holiday, was brought into the emergency department following a road traffic accident. On physical examination, apart from the traumatic injuries and bruises, there is absent axillary and pubic hair as well as minimal breast development and hyperpigmentation of the oral mucosa and axilla. CT traumagram (head, occiput to T1, chest including aortic arch, abdomen, and pelvis) reveals a cervical fracture but also bulky adrenal glands and an atrophic uterus. She reports a history of primary amenorrhoea which was thought to be due to pubertal delay. Her basic observations include heart rate 58 beats per minute, blood pressure 182/102 mmHg, Saturation 99% on room air, respiratory rate 18 breaths per minute. An arterial blood gas(ABG) was done. Hypokalaemia was found with a potassium of 2.9 mmol.

Given the likely diagnosis, what do you expect the rest of the ABG result to be?

- ☐ pH = 7.34, pO₂ = 14 kPa, pCO₂ = 5.2 kPa, bicarbonate = 20 mEq/L
- ☐ pH = 7.42, pO₂ = 14 kPa, pCO₂ = 3.9 kPa, bicarbonate = 28 mEq/L
- ☐ pH = 7.49, pO₂ = 14 kPa, pCO₂ = 5.0 kPa, bicarbonate = 32 mEq/L
- ☐ pH = 7.32, pO₂ = 7 kPa, pCO₂ = 6.8 kPa, bicarbonate = 37 mEq/L
- ☐ pH = 7.39, pO₂ = 14, pCO₂ = 4.9 kPa, bicarbonate = 25 mEq/L

pH = 7.34, pO₂ = 14 kPa, pCO₂ = 5.2 kPa, bicarbonate = 20 mEq/L

16%

pH = 7.42, pO₂ = 14 kPa, pCO₂ = 3.9 kPa, bicarbonate = 28 mEq/L

14%

pH = 7.49, pO₂ = 14 kPa, pCO₂ = 5.0 kPa, bicarbonate = 32 mEq/L

49%

pH = 7.32, pO₂ = 7 kPa, pCO₂ = 6.8 kPa, bicarbonate = 37 mEq/L

13%

pH = 7.39, pO₂ = 14, pCO₂ = 4.9 kPa, bicarbonate = 25 mEq/L

8%

Congenital adrenal hyperplasia is a cause of metabolic alkalosis

Important for me Less important

This patient has signs of undiagnosed congenital adrenal hyperplasia. Even though the classic 21-hydroxylase deficiency commonly presents in infancy, other rarer forms such as 17-alpha-hydroxylase deficiency could remain undiagnosed till adulthood, especially in the case of this patient who comes from a country where good paediatric care may not be easily accessible. Congenital adrenal hyperplasia is a cause of metabolic alkalosis. The ABG readings in Option 3 shows metabolic alkalosis.

Option 1 shows metabolic acidosis.

Option 2 shows metabolic acidosis with respiratory compensation.

Option 4 shows Type 2 respiratory failure, respiratory acidosis with partial metabolic compensation.

Option 5 shows a normal ABG.

Dr Assem

A 52-year-old man presents to the medical team with a 6-day history of fever, headache, rigors, diarrhoea and vomiting. His observations include temperature 39 °C, heart rate 110 beats per minute, respiratory rate 22, blood pressure 143/92 mmHg. He has been previous fit and well and has been working on a farm for the last 6 months. A diagnosis of Q fever is confirmed via PCR testing.

What is the organism implicated in this condition?

- ☐ *Rickettsia rickettsii*
- ☐ *Coxiella burnetti*
- ☐ *Rickettsia typhi*
- ☐ *Rickettsia prowazekii*
- ☐ *Ehrlichia*

Rickettsia rickettsii

18%

Coxiella burnetti

65%

Rickettsia typhi

7%

Rickettsia prowazekii

7%

Ehrlichia

4%

Coxiella burnetti is the causative organism in Q fever

Important for me [Less important](#)

Coxiella burnetti is the causative organism in Q fever.

Rickettsia rickettsii is the causative organism in Rocky Mountain spotted fever.

Rickettsia typhi is the causative organism in endemic typhus.

Rickettsia prowazekii is the causative organism in epidemic typhus.

Ehrlichia is the causative organism in ehrlichiosis.

Dr Assem

Which of the following conditions is not caused by a trinucleotide repeat expansion?

- ☐ Fragile X syndrome
- ☐ Huntington's
- ☐ Ataxia telangiectasia
- ☐ Myotonic dystrophy
- ☐ Friedreich's ataxia

Fragile X syndrome

16%

Huntington's

9%

Ataxia telangiectasia

40%

Myotonic dystrophy

21%

Friedreich's ataxia

13%

Dr. Arsem

Which one of the following is the best definition of the p value?

- ☐ The probability of obtaining a similar result, assuming that the null hypothesis is true
- ☐ The probability that a replicating experiment would not yield the same conclusion
- ☐ The probability of obtaining a result at least as extreme, assuming that the null hypothesis is true
- ☐ The probability that the null hypothesis is true
- ☐ The probability of obtaining a result at least as extreme, assuming that the null hypothesis is false

The probability of obtaining a similar result, assuming that the null hypothesis is true

20%

The probability that a replicating experiment would not yield the same conclusion

7%

The probability of obtaining a result at least as extreme, assuming that the null hypothesis is true

35%

The probability that the null hypothesis is true

19%

The probability of obtaining a result at least as extreme, assuming that the null hypothesis is false

19%

A 34-year-old man is stabbed in the back causing a hemisection of the spinal cord at the level T5. You assess the patient's sensory function, with respect to temperature, vibration, fine touch. You also assess the patient's muscle strength. Which signs would you expect to see?

- ☐ Ipsilateral loss of temperature, contralateral loss of fine touch and vibration, ipsilateral spastic paresis
- ☐ Contralateral loss of temperature, ipsilateral loss of fine touch and vibration, contralateral spastic paresis
- ☐ Contralateral loss of temperature, contralateral loss of fine touch and vibration, contralateral spastic paresis
- ☐ Ipsilateral loss of temperature, ipsilateral loss of fine touch and vibration, ipsilateral spastic paresis
- ☐ Contralateral loss of temperature, ipsilateral loss of fine touch and vibration, ipsilateral spastic paresis

Ipsilateral loss of temperature, contralateral loss of fine touch and vibration, ipsilateral spastic paresis

16%

Contralateral loss of temperature, ipsilateral loss of fine touch and vibration, contralateral spastic paresis

19%

Contralateral loss of temperature, contralateral loss of fine touch and vibration, contralateral spastic paresis

9%

Ipsilateral loss of temperature, ipsilateral loss of fine touch and vibration, ipsilateral spastic paresis

9%

Contralateral loss of temperature, ipsilateral loss of fine touch and vibration, ipsilateral spastic paresis

47%

The spinothalamic tract decussates at the same level the nerve root enters the spinal cord. The corticospinal tract, dorsal column medial lemniscus, and spinocerebellar tracts decussate at the medulla

Important for me Less important

The spinothalamic tract is responsible for carrying sensory fibres for pain and temperature. It decussates at the same level the nerve root enters the spinal cord, and hence temperature loss is contralateral. The dorsal column medial lemniscus carries sensory fibres for fine touch and vibration (and unconscious proprioception). It decussates at the medulla and hence the fine touch and vibration loss is ipsilateral. The corticospinal tract is a descending tract which has already decussated (at the medulla). It is responsible for inhibiting movement of muscles. Loss of its function causes an upper motor neuron lesion on the ipsilateral side (if affected in the spinal cord)

Which part of the renal tubule is impermeable to water?

- ☐ Distal convoluted tubule
- ☐ Connecting tubule
- ☐ Descending limb of loop of Henle
- ☐ Thin ascending limb of loop of Henle
- ☐ Thick ascending limb of loop of Henle

Distal convoluted tubule

11%

Connecting tubule

16%

Descending limb of loop of Henle

18%

Thin ascending limb of loop of Henle

28%

Thick ascending limb of loop of Henle

26%

The thin ascending limb of the loop of Henle is impermeable to water

Important for me Less important

The thin ascending limb is impermeable to water, but highly permeable to sodium and chloride ions.

As part of a research project you are trying to ascertain whether the use of dummies in infants is linked to sudden infant death syndrome. What is the most appropriate form of study design?

☐ Randomised controlled trial

☐ Cross-over trial

☐ Cross-sectional survey

☐ Case-control study

☐ Cohort study



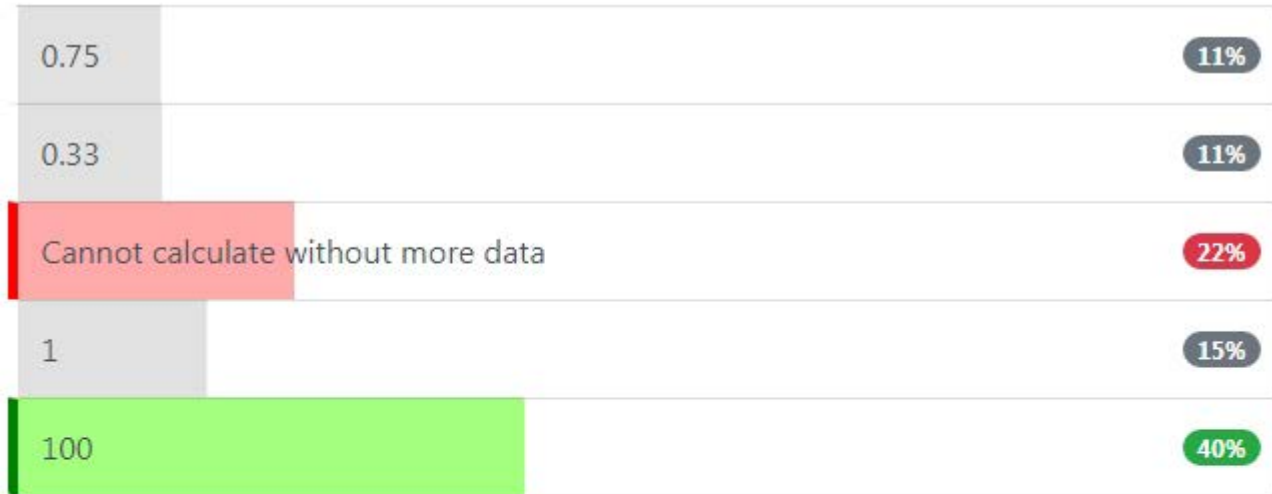
As sudden infant death syndrome is relatively rare a case-control design is more appropriate than a cohort study.

A study looks at the benefits of adding a new antiplatelet drug to aspirin following a myocardial infarction. The following results are obtained:

	Percentage of patients having further MI within 3 months	
Aspirin	4%	
Aspirin + new drug	3%	

What is the number needed to treat to prevent one patient having a further myocardial infarction within 3 months?

- ☐ 0.75
- ☐ 0.33
- ☐ Cannot calculate without more data
- ☐ 1
- ☐ 100



$NNT = 1 / \text{Absolute Risk Reduction}$

Important for me Less important

$NNT = 1 / (\text{control event rate} - \text{experimental event rate})$

$= 1 / (0.04 - 0.03) = 1 / (0.01) = 100$

A 34-year-old patient, comes in with weight loss and haemoptysis. On questioning, it is revealed he has significant night sweats. On examination, he has reduced breath sounds over the apex of his right lung and significant nail clubbing. After referral to the respiratory physician, he is started on 4 antibiotics: rifampicin, ethambutol, pyrazinamide, and isoniazid. What is the mechanism of action of rifampicin?

- ☐ Inhibit RNA synthesis
- ☐ Inhibit cell wall formation
- ☐ Inhibit DNA synthesis
- ☐ Inhibit 50S subunit of ribosomes
- ☐ Inhibit 30S subunit of ribosomes

Inhibit RNA synthesis

62%

Inhibit cell wall formation

6%

Inhibit DNA synthesis

12%

Inhibit 50S subunit of ribosomes

12%

Inhibit 30S subunit of ribosomes

8%

Rifampicin inhibits RNA synthesis

Important for me Less important

These are the classic presentation of an individual with tuberculosis. The combination of rifampicin, ethambutol, pyrazinamide and isoniazid is the first line treatment. Rifampicin's mechanism of action is to inhibit RNA synthesis.

Of the following scenarios, which one would indicate it was inappropriate for the patient to take an airline flight?

- A 54-year-old woman who had a laparoscopic cholecystectomy 5 days ago
- A 17-year-old flying back to the UK who broke his leg whilst skiing in Canada. Had a plaster cast applied 24 hours ago
- A 59-year-old man who had a colonoscopy 2 days ago
- A 62-year-old man who had an uncomplicated myocardial infarction 3 weeks ago
- A woman who is 27-weeks pregnant with twins

A 54-year-old woman who had a laparoscopic cholecystectomy 5 days ago

9%

A 17-year-old flying back to the UK who broke his leg whilst skiing in Canada.
Had a plaster cast applied 24 hours ago

52%

A 59-year-old man who had a colonoscopy 2 days ago

8%

A 62-year-old man who had an uncomplicated myocardial infarction 3 weeks ago

14%

A woman who is 27-weeks pregnant with twins

18%

Following the application of a plaster cast patients should wait 24 hours before short flights (< 2 hours) and 48 hours before longer flights. This is due to the fact that air may be trapped beneath the cast

A 36-year-old former intravenous drug user is to commence treatment for hepatitis C with interferon-alpha and ribavirin. Which of the following adverse effects are most likely to occur when patients are treated with interferon-alpha?

- ☐ Diarrhoea and transient rise in ALT
- ☐ Cough and haemolytic anaemia
- ☐ Flu-like symptoms and transient rise in ALT
- ☐ Haemolytic anaemia and flu-like symptoms
- ☐ Depression and flu-like symptoms

Diarrhoea and transient rise in ALT

6%

Cough and haemolytic anaemia

4%

Flu-like symptoms and transient rise in ALT

41%

Haemolytic anaemia and flu-like symptoms

14%

Depression and flu-like symptoms

34%

A 61-year-old woman presents to the emergency department with morning headaches, nausea and vomiting. An urgent CT head reveals a mass within the right frontal lobe. An MRI head is performed which shows what is likely a glioblastoma surrounded by oedema.

What medication is used in this context to treat oedema?

- ☐ Hydrocortisone
- ☐ Dexamethasone
- ☐ Hypertonic saline
- ☐ Mannitol
- ☐ Furosemide

Hydrocortisone	3%
Dexamethasone	72%
Hypertonic saline	3%
Mannitol	19%
Furosemide	2%

Dexamethasone is used to treat cerebral oedema in patients with brain tumours

Important for me Less important

Dexamethasone is a potent steroid with predominantly glucocorticoid effects. It is used to treat vasogenic oedema that occurs due to the break down of the blood-brain barrier. A common use within neurosurgery is to treat oedema caused by brain tumours.

What is the correct formula to calculate the negative predictive value of a screening test?

TP = true positive; FP = false positive; TN = true negative; FN = false negative

☐ $TN / (TN + FN)$

☐ $TP / (TP + FP)$

☐ $TN / (TN + FP)$

☐ $\text{Sensitivity} / (1 - \text{specificity})$

☐ $TP / (TP + FN)$

$TN / (TN + FN)$

67%

$TP / (TP + FP)$

5%

$TN / (TN + FP)$

17%

$Sensitivity / (1 - specificity)$

7%

$TP / (TP + FN)$

5%

Negative predictive value = $TN / (TN + FN)$

Important for me Less important

A 62-year-old man with mixed hyperlipidaemia, hypertension and ischaemic heart disease comes to the clinic for review. He has suffered a left lower limb deep vein thrombosis and been started on rivaroxaban for 3 months as treatment. there are no apparent risk factors for deep vein thrombosis and he has been fit and active, still working as a landscape gardener.

Which of the following medications that he takes may be associated with increased risk of deep vein thrombosis?

☐ Ramipril

☐ Atorvastatin

☐ Fenofibrate

☐ Bisoprolol

☐ Indapamide

Ramipril

6%

Atorvastatin

7%

Fenofibrate

55%

Bisoprolol

7%

Indapamide

25%

Fibrates may increase the risk of venous thromboembolism

Important for me

Less important

Questions were raised as to whether fibrates may be associated with venous thromboembolism after an imbalance in favour of comparator therapies with respect to thromboembolic events. A meta-analysis has now suggested that this imbalance may represent a real risk of VTE in patients prescribed fibrates: (OR, 1.58; 95% CI, 1.23–2.02).

<https://academic.oup.com/eurheartj/article/31/10/1248/486868>

The data from the same meta-analysis for statins suggests, although does not confirm, that they may be associated with reduced risk of venous thromboembolism: (OR, 0.81; 95% CI, 0.66–0.99), although the statin data was very heterogenous and may not therefore represent a real finding. Beta-blockers, thiazide like diuretics and ACE inhibitors are thought to have no impact on risk of venous thromboembolism.

A 69-year-old female with a history of multiple myeloma is admitted with confusion. The following results are obtained:

Na ⁺	147 mmol/l
K ⁺	4.7 mmol/l
Urea	14.2 mmol/l
Creatinine	102 µmol/l
Adjusted calcium	3.9 mmol/l

What is the most appropriate initial management?

- ☐ IV 0.45% saline
- ☐ IV zoledronic acid
- ☐ Oral prednisolone
- ☐ IV pamidronate
- ☐ IV 0.9% saline



IV fluid therapy is the first-line management in patients with hypercalcaemia

Important for me Less important

The raised sodium is a function of dehydration and will correct once the patient is adequately rehydrated

T-Helper cells of the Th2 subset typically secrete:

☐ IL-4, IL-5, IL-6, IL-10, IL-13

☐ IFN-gamma, IL-2, IL-3

☐ IL-1, IL-6, TNF-alpha

☐ IFN-beta, IL-4, IL-8

☐ IL-1

IL-4, IL-5, IL-6, IL-10, IL-13

59%

IFN-gamma, IL-2, IL-3

16%

IL-1, IL-6, TNF-alpha

13%

IFN-beta, IL-4, IL-8

8%

IL-1

4%

Each one of the following is an acute phase protein, except:

- ☐ Haptoglobin
- ☐ Alpha-1 antitrypsin
- ☐ CRP
- ☐ Ferritin
- ☐ ESR

Haptoglobin

17%

Alpha-1 antitrypsin

36%

CRP

4%

Ferritin

8%

ESR

35%

Dr. Ssem

Which one of the following cell types secretes the majority of pulmonary surfactant?

- ☐ Type II pneumocytes
- ☐ Kupffer cells
- ☐ Type I pneumocytes
- ☐ Macrophages
- ☐ Elastocytes

Type II pneumocytes

70%

Kupffer cells

8%

Type I pneumocytes

13%

Macrophages

5%

Elastocytes

4%

Which one of the following features is not associated with Turner's syndrome?

- ☐ Short stature
- ☐ High-arched palate
- ☐ Coarctation of the aorta
- ☐ Webbed neck
- ☐ Secondary amenorrhoea



Primary, not secondary, amenorrhoea is seen in Turner's syndrome

A 32-year-old man with familial hypercholesterolaemia comes to the lipid clinic for review. Despite 80mg of atorvastatin, his LDL cholesterol is still 3.8 and he suffered an inferior myocardial infarction some 3 months earlier. You elect to commence evolocumab.

Which of the following reflects the mode of action of evolocumab?

- ☐ Activates lipoprotein lipase
- ☐ Blocks absorption of cholesterol in the GI tract
- ☐ Inhibits PPAR-alpha
- ☐ Inhibits SGLT-1
- ☐ Prevents PCSK9-mediated LDL receptor degradation

Activates lipoprotein lipase	13%
Blocks absorption of cholesterol in the GI tract	13%
Inhibits PPAR-alpha	14%
Inhibits SGLT-1	6%
Prevents PCSK9-mediated LDL receptor degradation	54%

Evolocumab prevents PCSK9-mediated LDL receptor degradation. Evolocumab binds selectively to PCSK9 and prevents circulating PCSK9 from binding to the low-density lipoprotein receptor (LDLR) on the liver cell surface, thus preventing PCSK9-mediated LDLR degradation. Increasing liver LDLR levels results in associated reductions in serum LDL-cholesterol. Use of evolocumab is associated with a reduction in levels of free PCSK9 and this is taken as a measure of target engagement. it lowers LDL cholesterol by more than 50% in 85% of patients who are treated.

Fibrates increase lipoprotein lipase activity via PPAR-alpha agonism, and ezetimibe reduces intestinal absorption of cholesterol. SGLT-1 inhibitors reduce intestinal absorption of glucose.

Use of evolocumab is endorsed by NICE under certain conditions only, namely that the dosage is 140mg every 2 weeks and LDL cholesterol is persistently above 3.5 mmol/l.

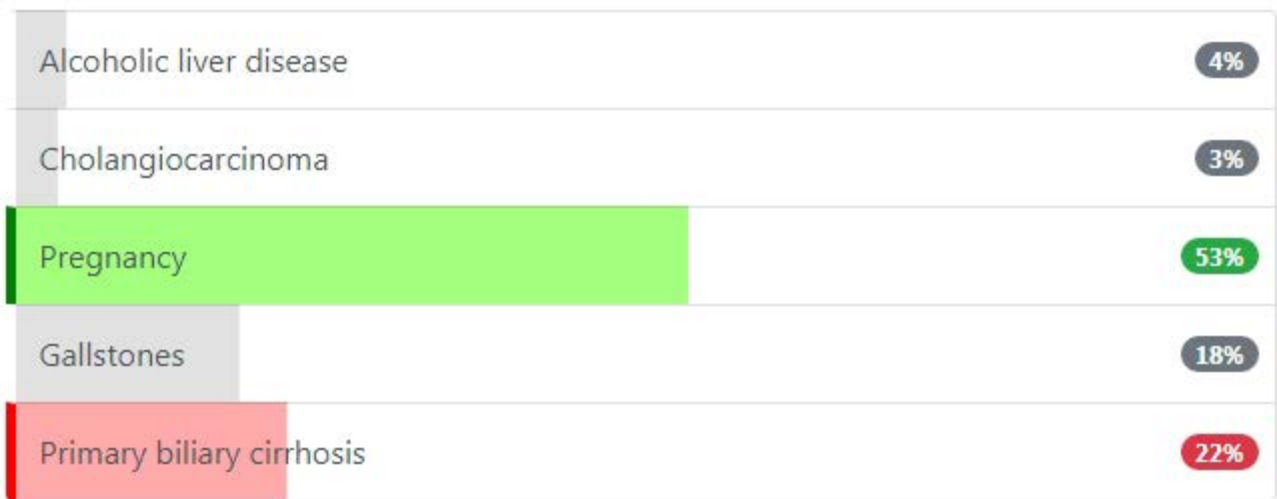
<https://www.nice.org.uk/guidance/ta394/chapter/1-recommendations>

A 17-year-old girl presents with a 6 week history of nausea and abdominal discomfort. Routine blood tests reveal the following.

Hb	10.9 g/dl
WBC	$6.7 \times 10^9/l$
Platelets	$346 \times 10^9/l$
Calcium	2.33 mmol/l
Bilirubin	7 $\mu\text{mol/l}$
ALP	262 u/l
ALT	35 u/l

What is the most likely diagnosis?

- ☐ Alcoholic liver disease
- ☐ Cholangiocarcinoma
- ☐ Pregnancy
- ☐ Gallstones
- ☐ Primary biliary cirrhosis



Alkaline phosphatase is significantly elevated in pregnancy. This would also explain the borderline anaemia

A new test to screen for ovarian cancer in patients with a positive family history is tested on 920 patients. The test is positive in 16 of the 20 patients who are proven to have ovarian cancer. Of the remaining patients, only 10 have a positive test. What is the negative predictive value of the new test?

☐ $900/920 = 97.8\%$

☐ $890/900 = 98.9\%$

☐ $10/900 = 1.1\%$

☐ $890/894 = 99.6\%$

☐ $890/920 = 96.7\%$

$$900/920 = 97.8\%$$

8%

$$890/900 = 98.9\%$$

21%

$$10/900 = 1.1\%$$

12%

$$890/894 = 99.6\%$$

54%

$$890/920 = 96.7\%$$

5%

Negative predictive value = $TN / (TN + FN)$

Important for me [Less important](#)

A contingency table can be constructed from the above data, as shown below:

	Ovarian cancer	No ovarian cancer
Test positive	16	10
Test negative	4	890

The negative predictive value = $TN / (TN + FN) = 890 / (890 + 4) = 890/894$

What are funnel plots primarily used for?

- Demonstrate the heterogeneity of a meta-analysis
- Demonstrate the existence of publication bias in meta-analyses
- Provide a graphical representation of the relative risk results in a case-control study
- Provide a graphical representation of the relative risk results in a cohort study
- Provide a graphical representation of the probability of a patient experiencing a particular adverse effect

Demonstrate the heterogeneity of a meta-analysis

17%

Demonstrate the existence of publication bias in meta-analyses

41%

Provide a graphical representation of the relative risk results in a case-control study

12%

Provide a graphical representation of the relative risk results in a cohort study

16%

Provide a graphical representation of the probability of a patient experiencing a particular adverse effect

13%

Funnel plots - show publication bias in meta-analyses

Important for me Less important

A 13-year-old girl presents with palpitations, fatigue and dyspnoea. She has had symptoms for around a year. There is no history of syncope or chest pain. On examination she has a pan-systolic murmur associated with giant V waves in the jugular venous pulse. Auscultation of the chest is unremarkable. A resting ECG is normal but a 24 hour tape shows a short burst of supraventricular tachycardia. What is the most likely diagnosis?

- ☐ Atrial septal defect
- ☐ Pulmonary stenosis
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Arrhythmogenic right ventricular cardiomyopathy
- ☐ Ebstein's anomaly

Atrial septal defect

13%

Pulmonary stenosis

11%

Hypertrophic obstructive cardiomyopathy

10%

Arrhythmogenic right ventricular cardiomyopathy

25%

Ebstein's anomaly

40%

Which one of the following statements best describes a type I statistical error?

- ☐ The null hypothesis is rejected when it is true
- ☐ The null hypothesis is accepted when it is false
- ☐ The p value fails to reach statistical significance
- ☐ The alternative hypothesis is rejected when it is true
- ☐ A study fails to reach an appropriate power

The null hypothesis is rejected when it is true

61%

The null hypothesis is accepted when it is false

21%

The p value fails to reach statistical significance

8%

The alternative hypothesis is rejected when it is true

6%

A study fails to reach an appropriate power

4%

You are a ST1 doctor in medicine. Whilst on-call you review a 60-year-old woman who is known to have COPD. She has been admitted with an infective exacerbation and has not responded to nebulisers and intravenous aminophylline. Her most recent blood gases show a worsening respiratory acidosis. You feel that non-invasive ventilation (NIV) is needed and bleep the on-call physio. After discussing the blood gas results over the phone she says that NIV is not indicated in her opinion and refuses to set it up. What is the most appropriate action?

- ☐ Phone her back in 30 minutes and exaggerate the clinical picture to persuade her to come in
- ☐ Accept her professional opinion and reassess the situation in 30 minutes
- ☐ Set-up the NIV equipment yourself to avoid any further delay
- ☐ As there is a disagreement on management speak to the consultant on-call
- ☐ Transfer the patient to another hospital

Phone her back in 30 minutes and exaggerate the clinical picture to persuade her to come in	3%
Accept her professional opinion and reassess the situation in 30 minutes	16%
Set-up the NIV equipment yourself to avoid any further delay	7%
As there is a disagreement on management speak to the consultant on-call	71%
Transfer the patient to another hospital	3%

By far the best option here is to speak to the consultant on-call. The physio may be experienced in providing NIV but it is ultimately a medical decision about whether to start a treatment.

Accepting her opinion is a poor option as she has not reviewed the patient herself and is only giving an opinion on the basis of blood gases.

Setting up NIV equipment requires training. If done incorrectly it could potentially harm a patient. Transferring an acutely unwell patient simply because the physio won't come in is not appropriate. Lying about clinical information is a very poor option.

You are advising a patient who has recently been diagnosed with chronic kidney disease stage 4 with regards to her diet. Which one of the following foods should she eat in moderation due to the high potassium content?

- ☐ Tomatoes
- ☐ Plums
- ☐ Cranberry juice
- ☐ Grapes
- ☐ Green beans

Tomatoes

56%

Plums

8%

Cranberry juice

13%

Grapes

10%

Green beans

13%

Dr. Arsem

You are working in the palliative care unit. A 65-year-old female has severe neuropathic pain secondary to spinal cord metastasis. It has been unresponsive to titration of opioid and neuropathic agents. Your consultant decides to use ketamine.

What is the mechanism of action of ketamine?

- ☐ GABA agonist
- ☐ GABA analogue
- ☐ Modulation of voltage-gated calcium channel
- ☐ NMDA receptor antagonist
- ☐ Sodium channel blocker

GABA agonist	16%
GABA analogue	13%
Modulation of voltage-gated calcium channel	9%
NMDA receptor antagonist	55%
Sodium channel blocker	7%

Ketamine is an NMDA receptor antagonist

Important for me [Less important](#)

Ketamine is an NMDA receptor antagonist. It can be used in neuropathic pain poorly responsive to titrated opioids and oral adjuvant analgesics (e.g. antidepressant and/or anticonvulsant) particularly when there is abnormal pain sensitivity (e.g. allodynia, hyperalgesia or hyperpathia).

Gabapentin acts by modulation of the voltage-gated calcium channel.

Pregabalin is a GABA analogue.

Benzodiazepines are GABA agonists.

Local anaesthetics (e.g. lidocaine) are sodium channel blockers.

What level of evidence does a study offer which is obtained from a meta-analysis of randomised controlled trials?

☐ Ia

☐ Ib

☐ IIa

☐ IIb

☐ IV

Ia

56%

Ib

13%

IIa

12%

IIb

10%

IV

10%

A 59-year-old man is investigated for exertional chest pain and is found to have extensive coronary artery disease on angiogram. Which of the following cell types is most implicated in the development of coronary artery plaques?

☐ Lymphocytes

☐ Platelets

☐ Macrophages

☐ Neutrophils

☐ Basophils



Although platelets are clearly central to the thrombotic cascade which develops following plaque rupture macrophages play a greater role in the initial development of the plaque.

Which one of the following statements regarding significance tests is **incorrect**?

- ☐ Parametric data is usually normally distributed
- ☐ Student's t-test may be paired or unpaired
- ☐ Pearson's product-moment coefficient is used to assess correlation between two variables
- ☐ Chi-squared test is used to compare parametric data
- ☐ Paired data refers to data obtained from a single group of patients

Which one of the following statements regarding significance tests is **incorrect**?

Parametric data is usually normally distributed

10%

Student's t-test may be paired or unpaired

10%

Pearson's product-moment coefficient is used to assess correlation between two variables

13%

Chi-squared test is used to compare parametric data

45%

Paired data refers to data obtained from a single group of patients

22%

Which one of the following statements regarding vitamin D-resistant rickets is false?

- ☐ Management includes the use of high-dose vitamin D supplements
- ☐ Is a X-linked dominant condition
- ☐ X-ray changes include cupped metaphyses
- ☐ Failure to thrive may be seen
- ☐ Decreased urinary phosphate is characteristic

Management includes the use of high-dose vitamin D supplements

24%

Is a X-linked dominant condition

21%

X-ray changes include cupped metaphyses

8%

Failure to thrive may be seen

6%

Decreased urinary phosphate is characteristic

42%

A two-year old boy presents with an abdominal mass. Which of the following is associated with Wilm's tumour (nephroblastoma)?

- ☐ Deletion on short arm of chromosome 12
- ☐ Tuberose sclerosis
- ☐ Beckwith-Wiedemann syndrome
- ☐ Autosomal dominant polycystic kidney disease
- ☐ Autosomal recessive polycystic kidney disease

Deletion on short arm of chromosome 12	20%
Tuberose sclerosis	14%
Beckwith-Wiedemann syndrome	40%
Autosomal dominant polycystic kidney disease	13%
Autosomal recessive polycystic kidney disease	12%

Beckwith-Wiedemann syndrome is a inherited condition associated with organomegaly, macroglossia, abdominal wall defects, Wilm's tumour and neonatal hypoglycaemia.

Which part of an antibody do immune cells bind to?

- ☐ Disulfide bridge
- ☐ Heavy-chain of antigen binding site
- ☐ Light-chain of antigen binding site
- ☐ Fc region
- ☐ Light-chain hypervariable region

Disulfide bridge	5%
Heavy-chain of antigen binding site	10%
Light-chain of antigen binding site	16%
Fc region	60%
Light-chain hypervariable region	10%

Immune cells bind to the crystallising region (Fc) of immunoglobulins

Important for me Less important

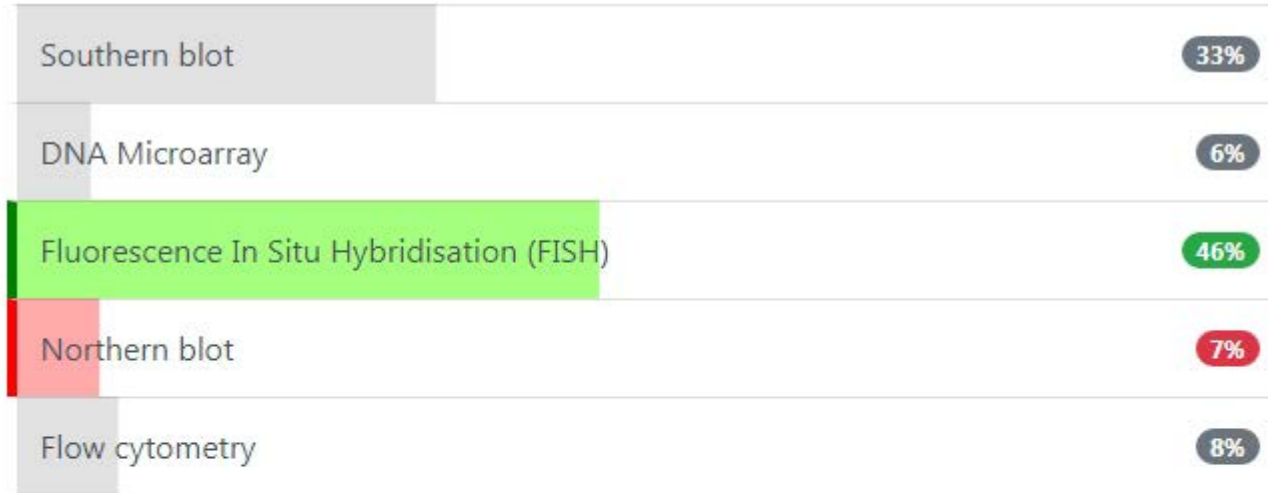
Antibodies (immunoglobulins) may be divided into 2 main pairs:

- Fab region: antigen-binding fragment - the region that binds to antigens
- Fc region: fragment crystallizable region - the tail region of an antibody that interacts with cell surface receptors

A scientist is investigating Chronic Myeloid Leukaemia (CML). He develops a fluorescent DNA probe to bind to BCR-ABL fusion gene for direct visualisation of Philadelphia translocation.

Which molecular technique is he using?

- ☐ Southern blot
- ☐ DNA Microarray
- ☐ Fluorescence In Situ Hybridisation (FISH)
- ☐ Northern blot
- ☐ Flow cytometry



Fluorescence in situ hybridization uses fluorescent DNA or RNA probe to bind to specific gene site of interest for direct visualisation of chromosomal anomalies

Important for me Less important

Fluorescence in situ hybridization uses fluorescent DNA or RNA probe to bind to specific gene site of interest for direct visualisation of chromosomal anomalies.

A patient comes into the GP due to a dry cough. He mentions that he becomes very easily short of breath and feels feverish. He admits to being an intravenous drug user. He is referred to the sexual health clinic and is diagnosed with HIV after blood tests. Which cell surface protein does HIV use to enter cells?

☐ CD3

☐ CD4

☐ CD5

☐ CD8

☐ CD14

CD3	6%
CD4	70%
CD5	6%
CD8	10%
CD14	7%

HIV uses CD4 to enter cells

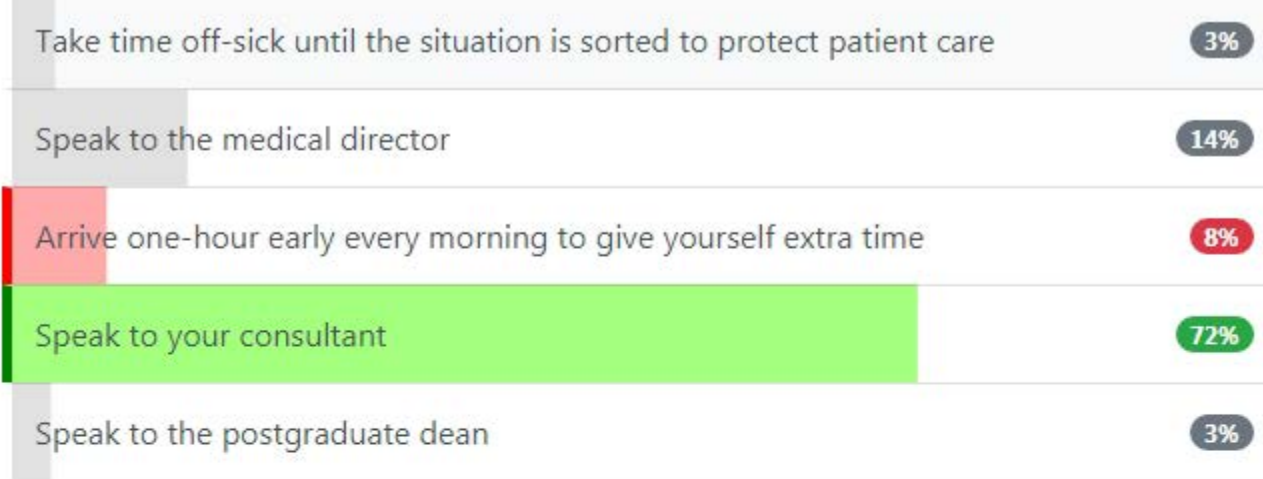
Important for me Less important

The patient in this scenario has *Pneumocystis pneumonia*, a lung infection from the fungus *Pneumocystis jiroveci*, which affects immunocompromised patients. HIV uses CD4 to enter cells - this is why specifically T helper cells are reduced in patients with HIV.

CD3 is a cell surface protein found on all T cells. CD5 is a cell surface marker commonly found in mantle cell lymphomas. CD8 is a cell surface marker found on cytotoxic T cells. CD14 is a cell surface marker found on macrophages.

You are a ST1 doctor working on a medical ward. You are struggling to cope with the workload and often leave the ward late. Who is the most appropriate action to take?

- ☐ Take time off-sick until the situation is sorted to protect patient care
- ☐ Speak to the medical director
- ☐ Arrive one-hour early every morning to give yourself extra time
- ☐ Speak to your consultant
- ☐ Speak to the postgraduate dean



Speaking to your consultant is the first action to take in this scenario. They are best placed to be able to take action to try and amend the situation. As the consultant is ultimately responsible for patient care they also have a right to know if you are struggling to cope as this may affect patient care.

The medical director may also be able to assist but would end up speaking to the consultant and hence is not the first choice.

Arriving early may seem an option but does not ultimately address the cause of the problem. Taking time off sick is the worst option - it doesn't address the problem and is unprofessional.

A 55-year-old lady with known metastatic breast cancer presents to the acute medical take with hypercalcaemia. She has no other co-morbidities, is a non-smoker and works in an office based job. She is treated with intravenous fluid and bisphosphonates, after which her calcium normalises and she is discharged.

At discharge, she is referred to the endocrinology department for outpatient follow-up, alongside regular blood calcium monitoring. What verbal advice is it most important to give her on discharge from hospital?

- ☐ Avoid excess exercise until treated
- ☐ Low calcium diet
- ☐ Reduce alcohol intake
- ☐ Ensure adequate sunlight exposure
- ☐ Increase fluid intake

Avoid excess exercise until treated

6%

Low calcium diet

8%

Reduce alcohol intake

9%

Ensure adequate sunlight exposure

7%

Increase fluid intake

70%

In the context of hypercalcaemia secondary to malignancy the below advice is suggested by NICE:

- Advice about maintaining good hydration (drinking 3-4 L of fluid per day), provided there are no contraindications (such as severe renal impairment or heart failure).
- Reassure that a low calcium diet is not necessary, as intestinal absorption of calcium is usually reduced.
- Advise the person to avoid any drugs or vitamin supplements that could exacerbate the hypercalcaemia.
- Encourage mobilization where possible to avoid exacerbating the hypercalcaemia.
- Advise the person to report any symptoms of hypercalcaemia.

Patients with deficiencies of which one of the following complement protein(s) are predisposed to immune complex diseases?

☐ C1-INH

☐ C1q, C1rs, C2, C4

☐ C5-9

☐ C3

☐ C3bBb

C1-INH

8%

C1q, C1rs, C2, C4

55%

C5-9

16%

C3

15%

C3bBb

7%

Each one of the following statements regarding atrial natriuretic peptide are true, except:

- ☐ Lowers blood pressure
- ☐ Degraded by endopeptidases
- ☐ Promotes excretion of sodium
- ☐ Secreted mainly by the left atrium
- ☐ Antagonises actions of angiotensin II and aldosterone

Lowers blood pressure

8%

Degraded by endopeptidases

15%

Promotes excretion of sodium

10%

Secreted mainly by the left atrium

49%

Antagonises actions of angiotensin II and aldosterone

17%

Dr. Ssem

A 32-year-old female patient is referred by GP to the urology clinic for 6-months non-specific pain in the right lower back and the abdomen, urinary frequency and haematuria. She is originally from Ghana and moved to the UK 3 months ago. Ultrasound of the kidney ureters and bladder (KUB) shows thickening of the bladder wall. CT KUB shows linear calcification of the entire surface area of the bladder wall as well as part of the left ureter. On further questioning, the patient reports when she was living in Ghana, she has been swimming in the local lake on a regular basis.

Given the likely diagnosis, what would be the most appropriate treatment?

- ☐ Linezolid
- ☐ Amoxicillin
- ☐ Co-trimoxazole
- ☐ Bendazole
- ☐ Praziquantel



Schistosoma haematobium can be treated with praziquantel

Important for me Less important

This patient likely has *Schistosoma haematobium*, which can be treated with praziquantel.

Helminth infections are not usually treatable with antibiotics such as linezolid and amoxicillin.

Co-trimoxazole is not usually used for the treatment of helminth infections.

Bendazole is used to treat a variety of helminth infections but not *Schistosoma haematobium*.

A 14-year-old girl is admitted to hospital following a ruptured ectopic pregnancy. She comes from a family of Jehovah's Witnesses. Her haemoglobin on admission is 6.9 g/dl. She consents to a blood transfusion but her mother refuses. What is the most appropriate course of action?

- ☐ Advise the parents she will have to get a High Court injunction in order to stop the transfusion
- ☐ Give the blood transfusion
- ☐ Transfer the patient to a hospital run by Jehovah's Witnesses
- ☐ Respect parental wishes and withhold the blood transfusion
- ☐ Ask the hospital lawyer to come in and decide upon the correct course of action

Advise the parents she will have to get a High Court injunction in order to stop the transfusion

11%

Give the blood transfusion

55%

Transfer the patient to a hospital run by Jehovah's Witnesses

7%

Respect parental wishes and withhold the blood transfusion

10%

Ask the hospital lawyer to come in and decide upon the correct course of action

18%

The GMC gives the following guidance:

'You should encourage young people to involve their parents in making important decisions, but you should usually abide by any decision they have the capacity to make themselves'

With respect to Jehovah's witnesses:

'You should not make assumptions about the decisions that a Jehovah's Witness patient might make about treatment with blood or blood products. You should ask for and respect their views and answer their questions honestly and to the best of your ability. You may also wish to contact the hospital liaison committees established by the Watch Tower Society (the governing body of Jehovah's Witnesses) to support Jehovah's Witnesses faced with treatment decisions involving blood. These committees can advise on current Society policy regarding the acceptability or otherwise of particular blood products. They also keep details of hospitals and doctors who are experienced in 'bloodless' medical procedures.'

A blood transfusion is clearly in the patient's best interests and in the scenario described above may potentially be life-saving. Whilst a child cannot refuse treatment they are able to provide consent. Giving the blood transfusion is therefore both clinically and ethically the right course of action.

Not giving the blood transfusion not only fails to respect the patient's wishes but also causes potential harm.

Which one of the following statements is true regarding the radial nerve?

- ☐ Damage at the axilla would lead to wrist drop
- ☐ Damage at the wrist leads to wasting of the thenar muscles
- ☐ It supplies the lateral 2 lumbricals
- ☐ It supplies sensation to the lateral one and a half fingers
- ☐ It is derived from C6-8 and T1

Damage at the axilla would lead to wrist drop

42%

Damage at the wrist leads to wasting of the thenar muscles

14%

It supplies the lateral 2 lumbricals

10%

It supplies sensation to the lateral one and a half fingers

15%

It is derived from C6-8 and T1

21%

You are a ST1 doctor in General Medicine. During an on-call you are in A&E seeing a patient who has a pneumothorax. On arriving you find the A&E ST2 doctor attempting to perform an aspiration. He appears to about to insert the needle at the wrong landmark. What is the most appropriate action?

- ☐ Tell your colleagues about what happened in the mess to ensure they are aware of the doctors limitations
- ☐ Say nothing, stay with the patient and take over when he asks for help
- ☐ Go and get the A&E consultant
- ☐ Say nothing at the time but fill in a clinical incident form
- ☐ Immediately voice your concerns and ask him to stop

Tell your colleagues about what happened in the mess to ensure they are aware of the doctors limitations

4%

Say nothing, stay with the patient and take over when he asks for help

6%

Go and get the A&E consultant

7%

Say nothing at the time but fill in a clinical incident form

3%

Immediately voice your concerns and ask him to stop

79%

If you have concerns regarding the management of a patient it is important to act on them. It may be that you are wrong - the ST2 doctor may actually be performing the aspiration using a recognised, safe technique. This should not however stop you voicing your concerns - failing to do so may put the patient at risk.

If you feel unable to do you should discuss your concerns with someone who is in a position to act. Saying nothing puts the patient at potential harm. Filling in a clinical incident form after the event will not alter this.

Spreading rumours in the mess about a doctors ability is unprofessional and unlikely to lead to a resolution of the problem.

Dr. K. Sem

Which one of the following is associated with increased lung compliance?

- ☐ Kyphosis
- ☐ Pulmonary oedema
- ☐ Emphysema
- ☐ Pulmonary fibrosis
- ☐ Pneumonectomy

Kyphosis

8%

Pulmonary oedema

7%

Emphysema

53%

Pulmonary fibrosis

6%

Pneumonectomy

25%

Which one of the following statements regarding interleukin 1 (IL-1) is true?

- ☐ It is released mainly by macrophages/monocytes
- ☐ It causes vasoconstriction
- ☐ It reduces expression of selectin molecules on the endothelium
- ☐ IL-1 antagonists are currently licensed for use in colorectal cancer
- ☐ It inhibits the release of nitric oxide by the endothelium

It is released mainly by macrophages/monocytes

65%

It causes vasoconstriction

8%

It reduces expression of selectin molecules on the endothelium

8%

IL-1 antagonists are currently licensed for use in colorectal cancer

8%

It inhibits the release of nitric oxide by the endothelium

10%

Which of the following is not a tumour suppressor gene?

☐ p53

☐ APC

☐ NF-1

☐ Rb

☐ myc



myc is an oncogene which encodes a transcription factor

A 74-year-old male is admitted to the Emergency Department after routine blood tests by his GP showed the following results. The patient has a background of stable essential thrombocytosis.

Na+	139 mmol/l
K+	6.6 mmol/l
Urea	4.2 mmol/l
Creatinine	68 μ mol/l

Hb	13.5 g/dl
Plt	800 $\times 10^9/l$
WBC	6.6 $\times 10^9/l$

His ECG was normal and he was given calcium gluconate along with an insulin/dextrose infusion. Following this his potassium improved to 6.1, however over the next few days he remained persistently hyperkalaemic.

What would you suspect is the cause of his high potassium given his high cell counts?

- ☐ Pseudohyperkalaemia
- ☐ Tumour lysis syndrome
- ☐ Hypomagnasaemia
- ☐ Conn's syndrome
- ☐ Chronic kidney disease

Pseudohyperkalaemia

53%

Tumour lysis syndrome

23%

Hypomagnasaemia

11%

Conn's syndrome

6%

Chronic kidney disease

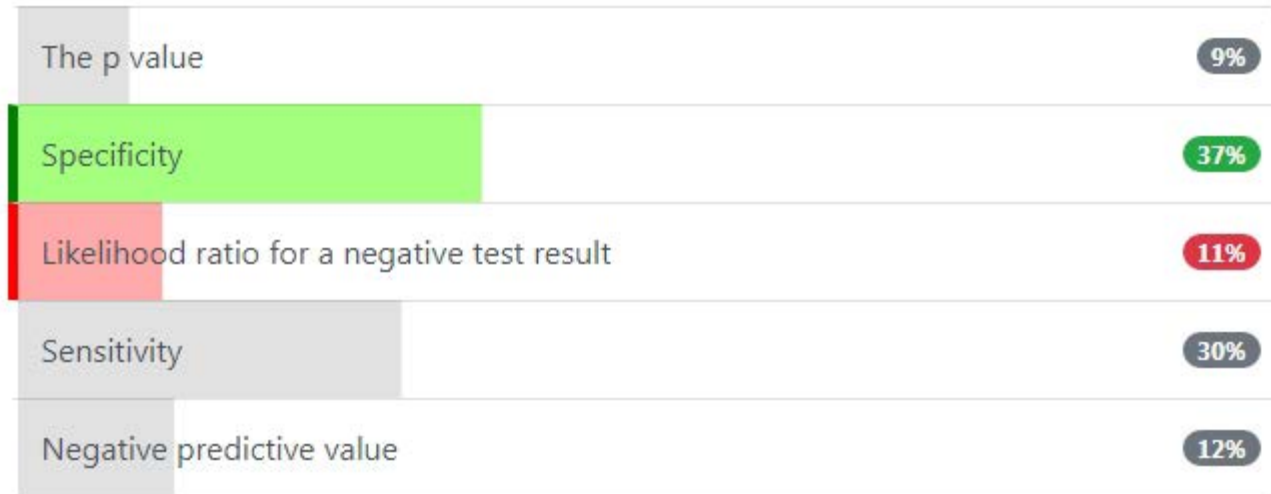
7%

High cell counts and high potassium: consider pseudohyperkalaemia

Dr Assem

A new screening test is developed for colorectal cancer. It is a blood test which detects a protein; the higher the level of the protein, the more likely a patient is to have colorectal cancer. If the cut-off for a positive test is increased, which one of the following will also be increased?

- ☐ The p value
- ☐ Specificity
- ☐ Likelihood ratio for a negative test result
- ☐ Sensitivity
- ☐ Negative predictive value



$$\text{Specificity} = \text{TN} / (\text{TN} + \text{FP})$$

Important for me Less important

Increasing the cut-off of a positive test result will decrease the number of false positives and hence increase the specificity

A study is carried out to assess the potential of hip protectors to reduce femoral neck fractures in elderly nursing home patients. The average age of the patients was 82 years. Over a two-year period 800 patients were recruited and assigned randomly either to the hip protector group or standard care group.

The results:

Hip protector group: 400 patients - 10 of whom had a femoral neck fracture over the two year period

Control group: 400 patients - 20 of whom had a femoral neck fracture over the two year period

What is the absolute risk reduction?

☐ 0.025

☐ 0.05

☐ 2

☐ 10

☐ 0.5



Absolute risk reduction = (Control event rate) - (Experimental event rate)

Important for me Less important

The absolute risk reduction = CER-EER, where:

Control event rate (CER) = (Number who had particular outcome with the control/ (Total number who had the control)

Experimental event rate (EER) = (Number who had particular outcome with the intervention) / (Total number who had the intervention)

$$\text{CER} = 20 / 400 = 1 / 20 = 0.05$$

$$\text{EER} = 10 / 400 = 1 / 40 = 0.025$$

$$\text{ARR} = \text{CER} - \text{EER} = 0.05 - 0.025 = 0.025$$

A 4-month-old female infant was admitted to hospital for diarrhoea and abdominal distension. She had a complicated birth with resuscitation attempts necessary. On examination, it is apparent she appears to be malnourished, has axial hypotonia and she has abnormal facial features. Blood tests elevated long-chain fatty acids levels. Which organelle is responsible for the catabolism of long chain fatty acids?

☐ Rough endoplasmic reticulum

☐ Nucleus

☐ Proteasome

☐ Peroxisome

☐ Lysosome



Peroxisomes are responsible for the catabolism of long chain fatty acids

Important for me Less important

This patient is presenting with symptoms of Zellweger syndrome a genetic disease which causes peroxisome dysfunction. Peroxisomes are the principle organelle responsible for the catabolism of long chain fatty acids.

Rough endoplasmic reticulum is responsible for the translation and folding of new proteins. The nucleus is responsible for containing and maintaining DNA, and the transcription of RNA. Proteasomes are responsible for the breakdown of proteins tagged with ubiquitin. Lysosomes are responsible for the catabolism of polysaccharides and proteins.

Whilst reviewing a patient's drug card you notice that you prescribed the wrong dose of atenolol when the patient was initially clerked. Instead of 25mg atenolol od you prescribed 50mg atenolol od. She has received the **incorrect** dose on two occasions. On examining Mrs Smith you note her blood pressure and pulse are normal. Mrs Smith has a past history of anxiety and describes herself as a 'worrier'. What is the most appropriate action?

- ☐ Complete an entry in your e-portfolio
- ☐ Apologise to the patient + complete a clinical incident form
- ☐ Complete a clinical incident form + avoid telling patient to prevent unnecessary anxiety
- ☐ Fill out a 'yellow card'
- ☐ Keep her on the higher dose as she is suffering no ill effects

Complete an entry in your e-portfolio	3%
Apologise to the patient + complete a clinical incident form	75%
Complete a clinical incident form + avoid telling patient to prevent unnecessary anxiety	11%
Fill out a 'yellow card'	4%
Keep her on the higher dose as she is suffering no ill effects	6%

In this scenario the patient appears to have come to no harm following the error. This should not however change your approach to the situation. The patient should be informed of what has happened, an apology should be made and reassurance given that there appears to be no ill effects. By completing a clinical incident form you add to a body of data which may in the long term change to practice.

An entry to your e-portfolio at least shows that you both acknowledge and are willing to learn from the error. The yellow card system is intended to report side-effects from drugs rather than prescription errors and hence is fairly pointless.

The dose of a drug a patient takes should be based on clinical need rather than a reluctance to acknowledge an error.

A 68-year-old man is admitted with central chest pain which is crushing in character. He has associated flushing.

ECG results:

ECG	T wave inversion in II,III and AVF
-----	------------------------------------

Blood results:

Troponin T	0.9 ng/ml (normal <0.01)
------------	--------------------------

Which substance does troponin T bind to?

- ☐ Calcium ions
- ☐ Tropomyosin
- ☐ Actin
- ☐ Myosin
- ☐ Sarcoplasmic reticulum

Calcium ions	7%
Tropomyosin	65%
Actin	12%
Myosin	10%
Sarcoplasmic reticulum	5%

Troponin T binds to tropomyosin, forming a troponin-tropomyosin complex

Important for me Less important

The clinical and electrographic features raise concerns over an inferior myocardial infarction which is confirmed by the raised troponin. Troponin T binds to tropomyosin, forming a troponin-tropomyosin complex. It is specific to myocardial damage.

Troponin C binds to calcium ions. It is released by damage to both skeletal and cardiac muscle making it an insensitive marker for myocardial necrosis.

Troponin I binds to actin to hold the troponin-tropomyosin complex in place. It is specific to myocardial damage.

Myosin is the thick component of muscle fibres. Actin slides along myosin to generate muscle contraction.

The sarcoplasmic reticulum regulates the calcium ion concentration in the cytoplasm of striated muscle cells

A 49-year-old man comes into clinic. One of his friends has recently had a myocardial infarction and he is concerned about his own risk of coronary heart disease. He has no past medical history of note other than anxiety for which he is not currently taking any medication. He does however smoke around 20 cigarettes a day. Cardiovascular examination is unremarkable. His BMI is 26 kg/m^2 and blood pressure is 126/82 mmHg.

You strongly advise him to stop smoking. What is the most appropriate further course of action?

- ☐ Reassure him that he has a very low risk of coronary heart disease given his age
- ☐ Arrange a 24 hour blood pressure monitor
- ☐ Arrange a lipid profile then calculate his QRISK2 score
- ☐ Start orlistat
- ☐ Refer him for an exercise tolerance test

Reassure him that he has a very low risk of coronary heart disease given his age 10%

Arrange a 24 hour blood pressure monitor 4%

Arrange a lipid profile then calculate his QRISK2 score 77%

Start orlistat 3%

Refer him for an exercise tolerance test 6%

If we feed his age, gender and smoking history into QRISK2 this gives a 10-year-risk of cardiovascular disease (CVD) of 13.9%. He is therefore an appropriate person to have a 'formal' assessment of CVD risk using a lipid profile to further inform the QRISK2 score.

How is the left ventricular ejection fraction calculated?

- ☐ End systolic LV volume / end diastolic LV volume
- ☐ End diastolic LV volume / end systolic LV volume
- ☐ End diastolic LV volume / stroke volume
- ☐ End systolic LV volume - end diastolic LV volume
- ☐ Stroke volume / end diastolic LV volume

End systolic LV volume / end diastolic LV volume

16%

End diastolic LV volume / end systolic LV volume

13%

End diastolic LV volume / stroke volume

16%

End systolic LV volume - end diastolic LV volume

12%

Stroke volume / end diastolic LV volume

43%

A 60-year-old man presents to the clinic with breathlessness. An urgent chest X-ray is arranged. Sputum cultures reveal that he has pneumonia. He is started on erythromycin. What is the mechanism of action of erythromycin?

- ☐ Inhibit 50S subunit of ribosomes
- ☐ Inhibit 30S subunit of ribosomes
- ☐ Inhibit protein wall synthesis
- ☐ Inhibit DNA synthesis
- ☐ Inhibit RNA synthesis

Inhibit 50S subunit of ribosomes

51%

Inhibit 30S subunit of ribosomes

23%

Inhibit protein wall synthesis

15%

Inhibit DNA synthesis

6%

Inhibit RNA synthesis

4%

Macrolides inhibit the 50S subunit of ribosomes

Important for me Less important

Erythromycin is a macrolide, which works by inhibiting the 50S subunit of ribosomes. This prevents the production of proteins from bacteria. Macrolides are commonly confused with tetracyclines, which inhibit the 30S subunit of ribosomes.

A 45-year-old female presents with ptosis and muscle weakness which worsens towards the end of the day. She has a past medical history of hypothyroidism. On examination you note fatigable ptosis and proximal limb weakness. You suspect a diagnosis of myasthenia gravis.

Which receptor is involved in the pathophysiology?

- ☐ Muscarinic acetylcholine receptors
- ☐ Nicotinic acetylcholine receptors
- ☐ Beta 1 adrenoceptor
- ☐ Beta 2 adrenoceptor
- ☐ Alpha 1 adrenoceptor

Muscarinic acetylcholine receptors

48%

Nicotinic acetylcholine receptors

39%

Beta 1 adrenoceptor

4%

Beta 2 adrenoceptor

4%

Alpha 1 adrenoceptor

4%

Skeletal muscle contraction is dependent on acetylcholine which activates nicotinic acetylcholine receptors

Important for me [Less important](#)

Skeletal muscle contraction is dependent on acetylcholine which activates nicotinic acetylcholine receptors.

Stimulation of the muscarinic acetylcholine receptor results in a variety of different effects dependent upon the subclass of receptor. For example stimulation of M2 receptors would result in a decreased heart rate which could worsen the compensation.

Stimulation of beta 1 adrenergic receptors result in increased heart rate and cardiac contractility.

Stimulation of beta 2 adrenergic receptors result in smooth muscle dilation e.g. bronchodilation.

Stimulation of alpha 1 adrenergic receptors result in vasoconstriction of the skin, gut and kidney arterioles. This helps increase total peripheral resistance and mean arterial pressure, as well as facilitate perfusion of the brain, heart and lungs which are key organs of use in the flight or fright response.



Discuss

Improve

Dr Asseil

A study looks at adding a new antiplatelet drug in addition to aspirin to patients who've had a stroke. One hundred and seventy patients are enrolled for the study with 120 receiving the new drug in addition to aspirin and the remainder receiving just aspirin. After 5 years 18 people who received the new drug had a further stroke compared to 10 people who just received aspirin. What is the number needed to treat?

☐ 8

☐ 15

☐ 1.8

☐ 20

☐ 10



$NNT = 1 / \text{Absolute Risk Reduction}$

Important for me Less important

Control event rate = $10 / 50 = 0.2$

Experimental event rate = $18 / 120 = 0.15$

Absolute risk reduction = $0.2 - 0.15 = 0.05$

Number needed to treat = $1 / 0.05 = 20$

Dr Assem

You are a ST1 doctor in general medicine. A 19-year-old female who has type 1 diabetes mellitus is admitted with her fourth episode of diabetic ketoacidosis in the past two months. You suspect she runs her sugars high to keep her weight down. She is generally non-compliant and often self-discharges after 24 hours. What is the most appropriate response?

- ☐ Take her on a tour of the ward showing her patients with amputated legs or those on dialysis as an incentive to get better control
- ☐ Have a chat after the ward round about why she thinks her control is so bad
- ☐ Write a letter to her GP advising him/her of your concerns
- ☐ Take no action as it is her decision whether she takes her medication or complies with treatment
- ☐ Tell her she is wasting NHS resources and you do not want to see her turn up at your hospital again

Take her on a tour of the ward showing her patients with amputated legs or those on dialysis as an incentive to get better control	8%
Have a chat after the ward round about why she thinks her control is so bad	68%
Write a letter to her GP advising him/her of your concerns	13%
Take no action as it is her decision whether she takes her medication or complies with treatment	6%
Tell her she is wasting NHS resources and you do not want to see her turn up at your hospital again	4%

Managing young diabetic patients may be frustrating but needs to be approached in an empathetic manner. Taking time to explore why her control is so bad is the best response in this scenario. The GP should hopefully have a long term relationship with the patient and may be in a position to address these problems.

Taking no action ignores the problem. Trying to scare her by showing her patients with complications is a poor option not least because it fails to respect the privacy of the other patients.

Telling her she is wasting NHS resources is uncaring and unprofessional. Telling her not to turn up at hospital again is indefensible from an ethical and medicolegal perspective.

A patient develops an eczematous, weeping rash on his wrist following the purchase of a new watch. In the Gell and Coombs classification of hypersensitivity reactions this is an example of a:

- ☐ Type I reaction
- ☐ Type II reaction
- ☐ Type III reaction
- ☐ Type IV reaction
- ☐ Type V reaction

Type I reaction

20%

Type II reaction

14%

Type III reaction

10%

Type IV reaction

52%

Type V reaction

5%

Type IV hypersensitivity reaction - allergic contact dermatitis

Important for me Less important

This patient has allergic contact dermatitis, which is commonly precipitated by nickel

Which one of the following statements best describes a type II statistical error?

- ☐ The p value fails to reach statistical significance
- ☐ A study fails to reach an appropriate power
- ☐ The null hypothesis is rejected when it is true
- ☐ The null hypothesis is accepted when it is false
- ☐ The alternative hypothesis is rejected when it is false

The p value fails to reach statistical significance

7%

A study fails to reach an appropriate power

8%

The null hypothesis is rejected when it is true

26%

The null hypothesis is accepted when it is false

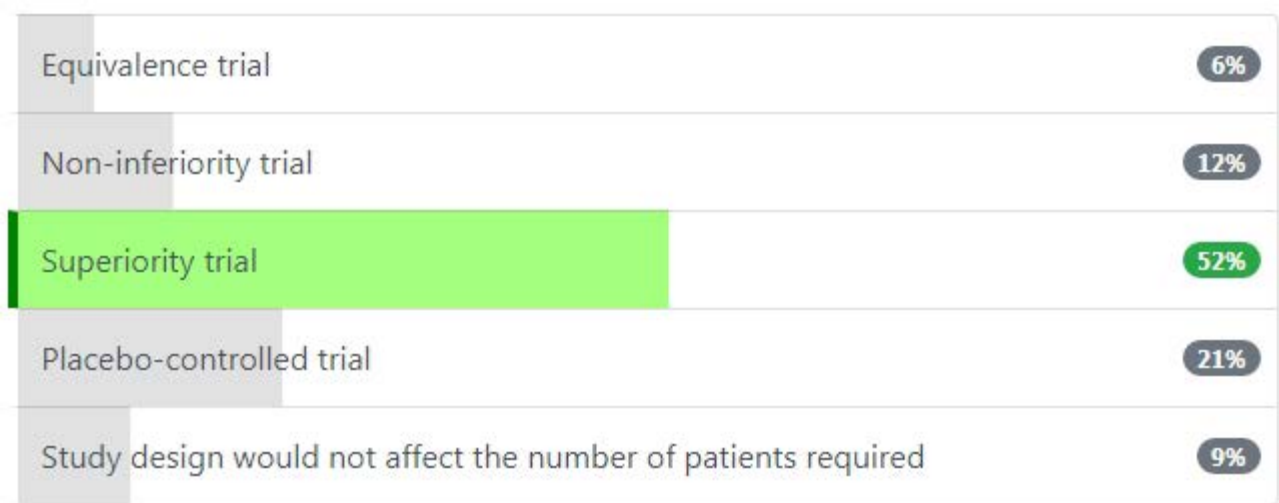
51%

The alternative hypothesis is rejected when it is false

8%

A new oral-hypoglycaemic is being developed. A number of different study types are considered to demonstrate efficacy in reducing the HbA1c. Which one of the following study designs would require the most patients to produce a significant result?

- ☐ Equivalence trial
- ☐ Non-inferiority trial
- ☐ Superiority trial
- ☐ Placebo-controlled trial
- ☐ Study design would not affect the number of patients required



As a superiority trial compares the new drug with an existing treatment, which would also lower HbA1c, a large sample size is required to demonstrate a significant difference.

A new drug is trialled for the treatment of lung cancer. Drug A is given to 500 people with early stage non-small cell lung cancer and a placebo is given to 450 people with the same condition. After 5 years 300 people who received drug A had survived compared to 225 who received the placebo. What is the number needed to treat to save one life?

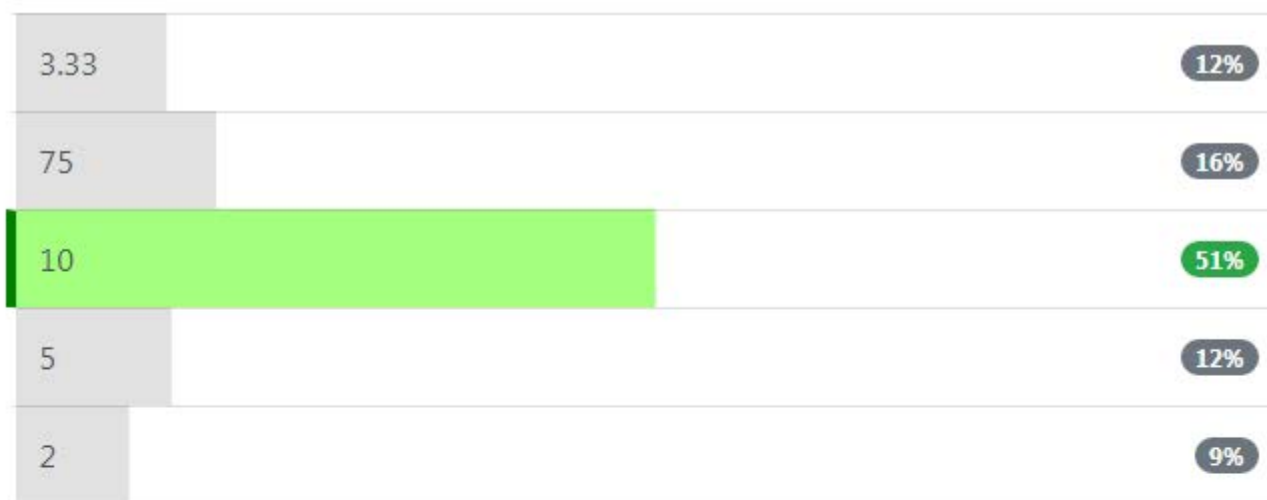
☐ 3.33

☐ 75

☐ 10

☐ 5

☐ 2



$NNT = 1 / \text{Absolute Risk Reduction}$

Important for me Less important

The question asks about the number needed to treat to save one life. The 'event' is therefore survival.

Experimental (drug A) event rate = $300 / 500 = 0.6$

Control (placebo) event rate = $225 / 450 = 0.5$

Absolute risk reduction = $0.6 - 0.5 = 0.1$

Number needed to treat = $1 / 0.1 = 10$

A patient diagnosed with chronic primary hyperparathyroidism was treated by parathyroidectomy and you are seeing him in clinic as a follow-up. His post-operative bloods are available to you in clinic:

Parathyroid hormone	1.8 pmol/L (1.6 - 6.9 pmol/L)
Corrected calcium	1.7 mmol/L (2.1 - 2.6 mmol/L)
Phosphate	0.1 mmol/L (0.1 - 0.8 mmol/L)

What is the most likely explanation for this?

- ☐ Osteomalacia
- ☐ Hungry bone syndrome
- ☐ Rickets
- ☐ Scurvy
- ☐ Parathyroid adenoma

Osteomalacia	24%
Hungry bone syndrome	61%
Rickets	5%
Scurvy	3%
Parathyroid adenoma	7%

Hungry bone syndrome is the result of a sudden drop in previously high parathyroid hormone levels

Important for me [Less important](#)

This question tests your knowledge of the complications of a parathyroidectomy following chronic hyperparathyroidism.

Osteomalacia - this is not the correct answer. Osteomalacia is a chronic condition which is not consistent with this patient's history.

Hungry bone syndrome - this is the correct answer. This presentation is a typical presentation of hungry bone syndrome, a rare but significant condition following a parathyroidectomy following chronic hyperparathyroidism. It causes hypocalcaemia.

Rickets - this is not the correct answer. Rickets is a condition in children.

Scurvy - this is not the correct answer. Scurvy is a vitamin deficiency which would not cause this picture.

Parathyroid adenoma - this is not the correct answer. This is more likely to cause hypercalcaemia.

A 35-year-old gentleman has attended his GP due to joint pains and reported skin changes.

On examination, you note a brownish/bluish pigment to his ears. On closer inspection, you also note a similar discolouration of his sclera bilaterally. His past history includes a prior knee joint replacement. A specialist urine sample is sent away, which ultimately shows elevated levels of homogentisic acid. What is the most likely unifying diagnosis?

- ☐ Osteogenesis imperfecta
- ☐ Alkaptonuria
- ☐ Porphyrria cutanea tarda
- ☐ Wilson disease
- ☐ Phenylketonuria

Osteogenesis imperfecta

24%

Alkaptonuria

39%

Porphyria cutanea tarda

12%

Wilson disease

9%

Phenylketonuria

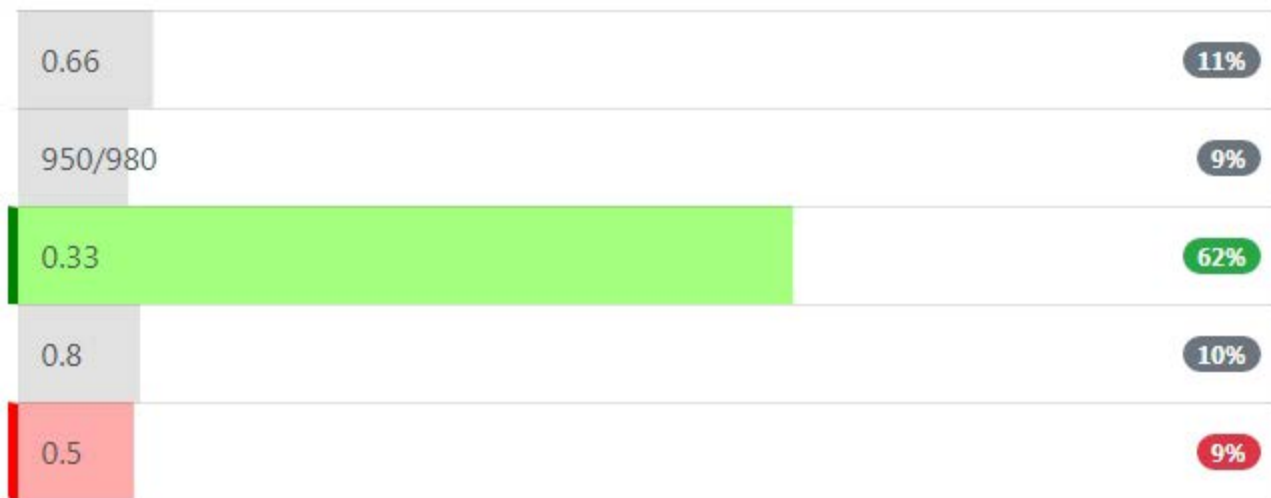
17%

Alkaptonuria is an autosomal recessive disorder that is a result of a deficiency of homogentisic acid dioxygenase leading to elevated levels of homogentisic acid (HGA). HGA then polymerises and forms a pigment that is deposited in connective tissue throughout the body (ochronosis). Clinically features include brown/bluish pigment of the ear cartilage or sclera, arthropathy, renal stones, cardiac valve involvement and coronary calcification.

Osteogenesis imperfecta causes blue sclera but is not associated with elevated HGA. Porphyria cutanea tarda, Wilson disease and phenylketonuria do not cause cartilage discolouration nor elevated HGA.

A new biochemical marker has been found which is increased in mothers who are carrying fetuses with Down's syndrome. The new blood test is trialled in 1,000 women over the age of 35 years. Of these women 20 were found to be carrying a fetus with Down's syndrome as assessed using standard measures. The new test was positive in 15 of the 20 cases but was also positive in 30 of the remaining 980 women. What is the positive predictive value of the test?

- ☐ 0.66
- ☐ 950/980
- ☐ 0.33
- ☐ 0.8
- ☐ 0.5



A contingency table can be constructed from the above data, as shown below:

	Down's	Not Down's
Test positive	15	30
Test negative	5	950

Positive predictive value = $TP / (TP + FP) = 15 / (15 + 30) = 0.33$

In terms of the cell cycle, which one of the following phases determine the length of the cell cycle:

☐ M

☐ M0

☐ G1

☐ S

☐ G2

M

11%

M0

10%

G1

48%

S

23%

G2

8%

T-Helper cells of the Th1 subset typically secrete:

- ☐ IFN-beta, IL-4, IL-8
- ☐ IFN-gamma, IL-2, IL-3
- ☐ IL-1, IL-6, TNF-alpha
- ☐ IL-1
- ☐ IL-4, IL-5, IL-6, IL-10, IL-13

IFN-beta, IL-4, IL-8

7%

IFN-gamma, IL-2, IL-3

57%

IL-1, IL-6, TNF-alpha

18%

IL-1

4%

IL-4, IL-5, IL-6, IL-10, IL-13

14%

A scientist is investigating potential targets for anti-HIV drugs. What is the role of reverse transcriptase in HIV infection?

- ☐ Inhibits topoisomeras II (DNA gyrase) and topoisomerase IV
- ☐ Prevents supercoiling during replication
- ☐ Unwinds the DNA double helix at the replication fork
- ☐ Transcribes viral RNA to host DNA
- ☐ Produces viral RNA in host cells from DNA template

Inhibits topoisomeras II (DNA gyrase) and topoisomerase IV

9%

Prevents supercoiling during replication

6%

Unwinds the DNA double helix at the replication fork

8%

Transcribes viral RNA to host DNA

59%

Produces viral RNA in host cells from DNA template

18%

A 23-year-old female patient presents to the emergency department with a 24-hour-history of gradual-onset global headache, fever and photophobia. On examination, there is neck stiffness and an area of non-blanching rash on the right shin. She had 3 episodes of meningococcal meningitis in the past. She was started on ceftriaxone for suspected meningitis. In the mean time, you suspect that the patient may have an immunodeficiency.

Which immunodeficiency is she likely to have?

- ☐ C1q, C1rs, C2, C4 deficiency
- ☐ C10 deficiency
- ☐ C5 deficiency
- ☐ C1 inhibitor (C1-INH) protein deficiency
- ☐ C5-9 deficiency

C1q, C1rs, C2, C4 deficiency	12%
C10 deficiency	5%
C5 deficiency	22%
C1 inhibitor (C1-INH) protein deficiency	10%
C5-9 deficiency	52%

C5-9 deficiency predisposes to *Neisseria meningitidis* infections

Important for me Less important

C5-9 deficiency predisposes to *Neisseria meningitidis* infections.

C1q, C1rs, C2, C4 deficiency (classic pathway components) predisposes to SLE.

C5 deficiency predisposes to Leiner disease (recurrent diarrhoea, wasting and seborrhoeic dermatitis).

C1 inhibitor (C1-INH) protein deficiency causes hereditary angioedema.

There is no C10 complement.

Which of the following conditions is inherited in an autosomal dominant fashion?

- ☐ Familial Mediterranean Fever
- ☐ Homocystinuria
- ☐ Tuberous sclerosis
- ☐ Ataxia telangiectasia
- ☐ Friedreich's ataxia

Familial Mediterranean Fever

16%

Homocystinuria

12%

Tuberous sclerosis

43%

Ataxia telangiectasia

15%

Friedreich's ataxia

15%

Autosomal recessive conditions are 'metabolic' - exceptions: inherited ataxias

Autosomal dominant conditions are 'structural' - exceptions: Gilbert's, hyperlipidaemia type II

Important for me Less important

A 52-year-old has a fasting lipid profile checked as part of an annual occupational health check. Combined with his blood pressure and current smoking status his 10-year risk of cardiovascular disease is calculated to be 23% percent. Following appropriate counselling he chooses to start atorvastatin 20mg. He is followed up 3 months later when a full lipid profile is repeated. What should his target be?

- ☐ A greater than 40% reduction in non-HDL cholesterol
- ☐ Total cholesterol < 5 mmol/l
- ☐ Target cholesterol is inappropriate in this situation
- ☐ Total cholesterol < 4 mmol/l
- ☐ Total cholesterol:HDL ratio < 4

A greater than 40% reduction in non-HDL cholesterol

58%

Total cholesterol < 5 mmol/l

11%

Target cholesterol is inappropriate in this situation

10%

Total cholesterol < 4 mmol/l

13%

Total cholesterol:HDL ratio < 4

8%

In the primary prevention of CVD using statins aim for a reduction in non-HDL cholesterol of > 40%

Important for me Less important

Where is secretin secreted from?

- ☐ I cells in upper small intestine
- ☐ G cells in stomach
- ☐ K cells in upper small intestine
- ☐ D cells in the pancreas
- ☐ S cells in upper small intestine

I cells in upper small intestine

13%

G cells in stomach

8%

K cells in upper small intestine

5%

D cells in the pancreas

11%

S cells in upper small intestine

63%

Secretin - S cells in upper small intestine

Important for me Less important

A 43-year-old homeless lady has been referred to gastroenterology as the GP was concerned of a possible malabsorption syndrome. She complains of weakness and longstanding diarrhoea. On examination you note enlarged and bleeding gums. She takes no medications.

Which of the following deficiency syndromes can lead to gum hypertrophy?

- ☐ Pellagra
- ☐ Beri-Beri
- ☐ Menkes Disease
- ☐ Scurvy
- ☐ Osteomalacia

Pellagra	12%
Beri-Beri	8%
Menkes Disease	5%
Scurvy	74%
Osteomalacia	2%

Scurvy causes gum hypertrophy

Important for me [Less important](#)

The answer is scurvy - caused by vitamin C deficiency. Patients classically can present with gingivitis, non-healing ulcers, myalgia and even convulsions.

Other important causes of gingivitis include pregnancy, acute promyelocytic leukaemia and drugs such as phenytoin, ciclosporin and nifedipine.

Pellagra is niacin (B3) deficiency, classically causing dermatitis, diarrhoea and dementia. Beri-Beri is caused by thiamine deficiency (B1) and is further categorised into wet (predominantly high output heart failure) and dry (predominantly neuropathic). Menkes Disease is a rare congenital disorder of copper metabolism leading to copper deficiency and osteomalacia is vitamin D deficiency.

A 1-month old male baby presents to the paediatric emergency department with an episode of tonic-clonic seizure preceded by a 1-week history of poor feeding, wheezing and general failure to thrive. The baby was born at term with no complication. There is no significant past medical history. On examination, the baby has a small jaw and mouth, low set ears and long face. Chest X-ray shows opacification in the right lower zone. An echocardiogram confirms a large ventricular septal defect.

What other pathology is this patient likely to have?

- ☐ B lymphocyte deficiency
- ☐ T and B lymphocyte deficiency
- ☐ T lymphocyte deficiency
- ☐ Granulocyte deficiency
- ☐ Complement deficiency

B lymphocyte deficiency	15%
T and B lymphocyte deficiency	17%
T lymphocyte deficiency	39%
Granulocyte deficiency	10%
Complement deficiency	18%

DiGeorge syndrome - a T-cell disorder

Important for me Less important

The baby's presentation suggests DiGeorge syndrome. The seizure episode is likely caused by hypocalcaemia from hypoparathyroidism. He also has syndromic features of DiGeorge syndrome and congenital heart disease. There is evidence of infection which indicates that immunodeficiency is likely. T-lymphocyte deficiency in DiGeorge syndrome is usually due to thymic hypoplasia.

The other options are not correct as they are not consistent with DiGeorge syndrome.

A 27-year-old female presents to her General Practitioner with severe morning headaches associated with nausea. She is referred for an MRI head scan that reveals a large tumour arising from the falx cerebri and pushing on the brain. There is a well-defined border between the tumour and the brain parenchyma.

What is the most likely diagnosis?

- ☐ Glioblastoma
- ☐ Metastasis
- ☐ Low-grade glioma
- ☐ Meningioma
- ☐ Craniopharyngioma

Glioblastoma

22%

Metastasis

5%

Low-grade glioma

8%

Meningioma

51%

Craniopharyngioma

14%

Meningiomas are typically benign tumours that develop from the dura mater of the meninges

Important for me [Less important](#)

Meningiomas are typically benign tumours that arise from the cap cells of the dura mater of the meninges. They are extra-axial lesions, meaning they do not arise from the brain parenchyma. They do not invade the brain substance, but rather cause symptoms by compression.

Dr Assem

In 2015 The New England Journal of Medicine reported that the sodium-glucose co-transporter 2 inhibitor, empagliflozin, resulted in a reduction in cardiovascular deaths, non-fatal myocardial infarction and non-fatal stroke when added to standard care in patients with type 2 diabetes at high risk of cardiovascular events. They expressed the result per 1000 patient years, with empagliflozin having an event rate of 37.3/1000 patient years and placebo an event rate of 43.9/1000 patient years. Using this information, approximately how many patients at high risk of adverse cardiovascular outcome need to be treated with empagliflozin to prevent one cardiovascular death, non-fatal myocardial infarction or non-fatal stroke?

☐ 1000

☐ 150

☐ 200

☐ 50

☐ 100

1000	8%
150	50%
200	16%
50	14%
100	11%

It is important to be able to interpret clinical papers correctly so that information can be expressed in a clinically meaningful way. The number needed to treat (NNT) is one such method and is the inverse of the absolute risk reduction:

$$\text{NNT} = 1 / \text{Absolute risk reduction}$$

The absolute risk reduction is the change in the risk of an outcome of a given treatment in relation to the comparison treatment. It is the difference between the treatment event rate and the control event rate.

The tricky part of this question is that the data is expressed per 1000 patient years. When a study outcome is based on time of exposure (patient-years), the NNT is calculated based on cumulative event proportions. This requires some complex calculations which you would never be expected to perform in an exam (you aren't allowed calculators); however, a quick way to get an estimate of the number needed to treat is by performing the following calculation:

$$\text{ARR} = (\text{Control event rate expressed per 1000 patient years}) - (\text{Experimental event rate expressed per 1000 patient years})$$

For the above question:

$$\text{ARR} = 43.9 - 37.3$$

$$\text{ARR} = 6.6 / 1000 \text{ patient years}$$

$$\text{NNT} = (\text{Patient years}) / \text{ARR}$$

$$\text{NNT} = 1000 / 6.6$$

$$\text{NNT} = 151.5 \text{ (which is closest to 150, the correct answer here)}$$

A 56-year-old female presents with a breast lump in her right breast. Following further investigations she has been diagnosed with breast cancer and genetic analysis shows a mutation in the p53 gene. Targeted chemotherapy agents are developed towards p53.

Which phase in the cycle is influenced by p53 and determines the cell cycle length?

☐ G0

☐ S1

☐ G1

☐ S2

☐ M

Submit answer



G1 phase determines cell cycle length

Important for me [Less important](#)

G1 determines the length of the cell cycle. p53 is an important protein involved in DNA repair and initiation of apoptosis to name a few. Thus if this important protein is mutated the likelihood of cancer is increased.

Discuss

Improve

Next question >

Cell cycle

The cell cycle is regulated by proteins called cyclins which in turn control cyclin-dependent kinase (CDK) enzymes.

Phase	Notes	Regulatory proteins
G ₀	'resting' phase - quiescent cells such as hepatocytes and more permanently resting cells such as neurons	
G ₁	Gap 1, cells increase in size - determines length of cell cycle - under influence of p53	Cyclin D / CDK4, Cyclin D / CDK6 and Cyclin E / CDK2: regulates transition from G1 to S phase
S	Synthesis of DNA, RNA and histone - centrosome duplication	Cyclin A / CDK2: active in S phase
G ₂	Gap 2, cells continue to increase in size	Cyclin B / CDK1: regulates transition from G ₂ to M phase
M	Mitosis - cell division - the shortest phase of the cell cycle	

A 22-year-old female patient presents with a 48 hour history of headache, fever and photophobia. She has a 3-year old child who has had a recent diarrheal illness. Serum blood glucose was 4 mmol/L.

A lumbar puncture reveals the following:

Fluid	Clear & colourless
White cell count	16 cells/ μ L (100% lymphocytes)
Protein	0.8 g/L
Glucose	3mmol/L

What is the most appropriate treatment option?

- ☐ Ceftriaxone
- ☐ Chloramphenicol
- ☐ No treatment indicated
- ☐ Immunoglobulins
- ☐ Ganciclovir

Submit answer

Ceftriaxone	14%
Chloramphenicol	4%
No treatment indicated	41%
Immunoglobulins	7%
Ganciclovir	33%

Antivirals are of no benefit in the treatment of confirmed viral meningitis

Important for me

Less important

Viral meningitis does not require any treatment and is usually a self-limiting infection. This should be differentiated from viral encephalitis, which has a different presentation and does need treatment. Care should be taken with the clinical history as the same organism can cause both presentations e.g HSV.

The history here is suggestive of a meningitis picture, this combined with the CSF results suggests a viral meningitis.

Most cases of viral meningitis are caused by enterovirus. There are no current treatments of proven benefit that should be used in viral meningitis.

Ganciclovir is not accepted first line treatment for either meningitis or encephalitis.

Refer to 'The UK joint specialist societies guideline on the diagnosis and management of acute meningitis and meningococcal sepsis in immunocompetent adults'. (2016)

Discuss

Improve

Enteroviruses

Enteroviruses are positive-sense single stranded RNA viruses. The family contains the Coxsackievirus, echovirus and rhinovirus as well as others. It is the most common cause of viral meningitis in the adult population but can cause a range of different diseases, in both adults and children. Although the range of diseases caused by these viruses is broad, notable disease entities include Hand, Foot and Mouth disease, herpangina and pericarditis.

A 67-year-old man who is a retired builder presents following the development of a number of red, scaly lesions on his left temple. These were initially small and flat but are now erythematous and rough to touch. What is the most likely diagnosis?

- ☐ Pityriasis versicolor
- ☐ Seborrhoeic keratosis
- ☐ Polymorphous light eruption
- ☐ Actinic keratoses
- ☐ Malignant melanoma

Pityriasis versicolor

8%

Seborrhoeic keratosis

18%

Polymorphous light eruption

8%

Actinic keratoses

59%

Malignant melanoma

8%

A 15-year-old male returns to the dermatology clinic for review. He has a past history of acne and is currently treated with oral lymecycline. There has been no response to treatment and examination reveals evidence of scarring on his face. What is the most suitable treatment?

- ☐ Oral doxycycline
- ☐ Oral cyproterone acetate
- ☐ Oral isotretinoin
- ☐ IV retinoin
- ☐ Topical retinoids

A 15-year-old male returns to the dermatology clinic for review. He has a past history of acne and is currently treated with oral lymecycline. There has been no response to treatment and examination reveals evidence of scarring on his face. What is the most suitable treatment?

Oral doxycycline

13%

Oral cyproterone acetate

15%

Oral isotretinoin

38%

IV retinoin

13%

Topical retinoids

21%

A 55-year-old female is referred to dermatology due to a lesions over both shins. On examination symmetrical erythematous lesions are found with an orange peel texture. What is the likely diagnosis?

- ☐ Pretibial myxoedema
- ☐ Pyoderma gangrenosum
- ☐ Necrobiosis lipoidica diabetorum
- ☐ Erythema nodosum
- ☐ Syphilis

Pretibial myxoedema

47%

Pyoderma gangrenosum

9%

Necrobiosis lipoidica diabeticorum

25%

Erythema nodosum

15%

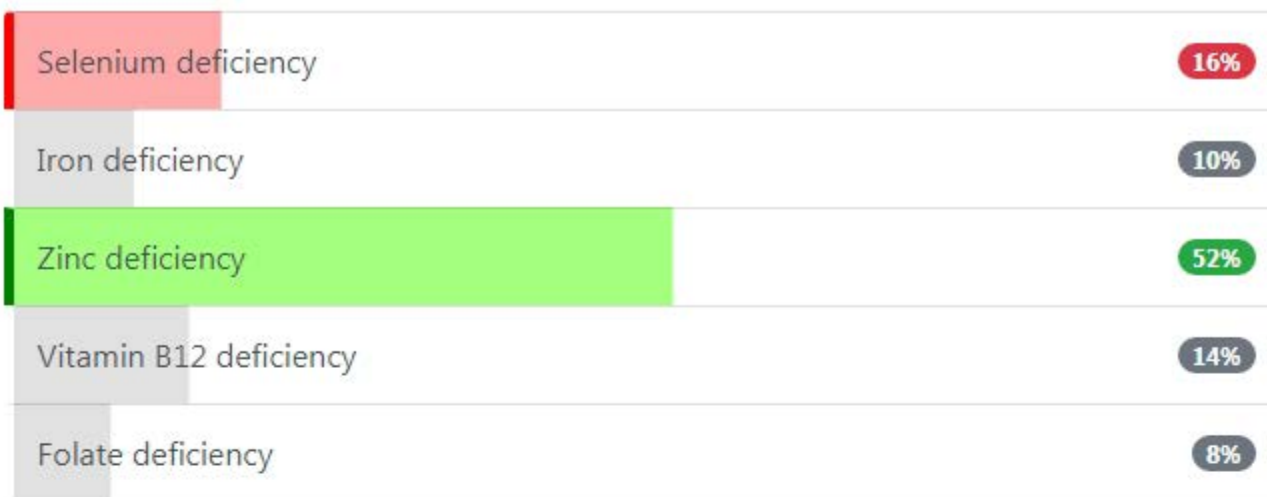
Syphilis

5%

A 23-year-old man with very severe Crohn's disease has been put on complete bowel rest for an indefinite period of time whilst he continues his in-patient recovery. He has been receiving total parenteral nutrition for the past few weeks. Recently he has noticed his skin becoming dry and scaly with mouth ulcers and lip swelling.

What is the likely cause of these changes?

- ☐ Selenium deficiency
- ☐ Iron deficiency
- ☐ Zinc deficiency
- ☐ Vitamin B12 deficiency
- ☐ Folate deficiency



Zinc deficiency caused by total parenteral nutrition (TPN) can result in acrodermatitis herpetiformis

Important for me [Less important](#)

Various small bowel diseases that cause destruction or malfunction of the gut mucosa and malabsorption lead to zinc deficiency. This has similarly been noticed in patients on total parenteral nutrition (TPN) who do not receive zinc - resulting in acrodermatitis herpetiformis causing peri-orificial dermatitis and alopecia.

Selenium deficiency can contribute to fatigue, hair loss, weight gain, joint and muscle pain.

Iron deficiency can contribute to fatigue, weakness, pale skin, chest pain, shortness of breath, headache, dizziness and cold peripheries.

Vitamin B12 deficiency can cause a smooth tongue, nerve problems like numbness or tingling, pale skin and weakness.

Folate deficiency can cause a lack of energy, pale skin, palpitations, headaches and loss of appetite.

A 43-year-old man comes for review. A few months ago he developed redness around his nose and cheeks. This is worse after drinking alcohol. He is concerned as one of his work colleagues asked him if he had a drink problem despite him drinking 14 units per week. On examination he has erythema as described above with some pustules on the nose and telangiectasia on the cheeks. What is the most likely diagnosis?

- ☐ Mitral stenosis
- ☐ Seborrhoeic dermatitis
- ☐ Alcohol-related skin changes
- ☐ Acne rosacea
- ☐ Systemic lupus erythematosus



This is a typical history of acne rosacea

A 35-year-old female presents tender, erythematous nodules over her forearms. Blood tests reveal:

Calcium	2.78 mmol/l
---------	-------------

What is the most likely diagnosis?

- ☐ Granuloma annulare
- ☐ Erythema nodosum
- ☐ Lupus pernio
- ☐ Erythema multiforme
- ☐ Necrobiosis lipoidica

Granuloma annulare

9%

Erythema nodosum

65%

Lupus pernio

13%

Erythema multiforme

8%

Necrobiosis lipoidica

6%

The likely underlying diagnosis is sarcoidosis

Dr. Assem

A 29-year-old man consults you regarding a rash he has noticed around his groin. It has been present for the past 3 months and is asymptomatic. On examination, a symmetrical rash around the groin is noted consisting of well-defined pink/brown patches with fine scaling and superficial fissures.

What is the most likely diagnosis?

- ☐ Erythrasma
- ☐ Pityriasis versicolor
- ☐ Secondary syphilis
- ☐ Acanthosis nigricans
- ☐ *Candida* intertrigo

Erythrasma

40%

Pityriasis versicolor

23%

Secondary syphilis

5%

Acanthosis nigricans

12%

Candida

intertrigo

20%

A 78 year-old woman presents with a poorly healing area of skin on her ankle. She has a history of deep vein thrombosis 20 years ago following a hip replacement. She currently takes Adcal D3, and no other medications. On examination there is a shallow ulcer anterior to the medial malleolus. She is otherwise very well.

What investigation would be most useful in determining further management?

- ☐ Serum calcium
- ☐ Ankle-brachial pressure index
- ☐ CT venogram
- ☐ C-reactive protein
- ☐ Lower limb doppler

Serum calcium	4%
Ankle-brachial pressure index	66%
CT venogram	10%
C-reactive protein	4%
Lower limb doppler	15%

This patient has the classic appearances of a venous ulcer. She is systemically well with no evidence to suggest infection. The most appropriate management of venous ulcers is with compression dressings, however it is important to make sure the patient's arterial supply is good enough to allow some compression.

Which of the following conditions is most associated with onycholysis?

- ☐ Bullous pemphigoid
- ☐ Raynaud's disease
- ☐ Osteogenesis imperfecta
- ☐ Oesophageal cancer
- ☐ Scabies

Bullous pemphigoid

20%

Raynaud's disease

38%

Osteogenesis imperfecta

19%

Oesophageal cancer

13%

Scabies

10%

Raynaud's disease causes onycholysis, as can any cause of impaired circulation

Dr Assef

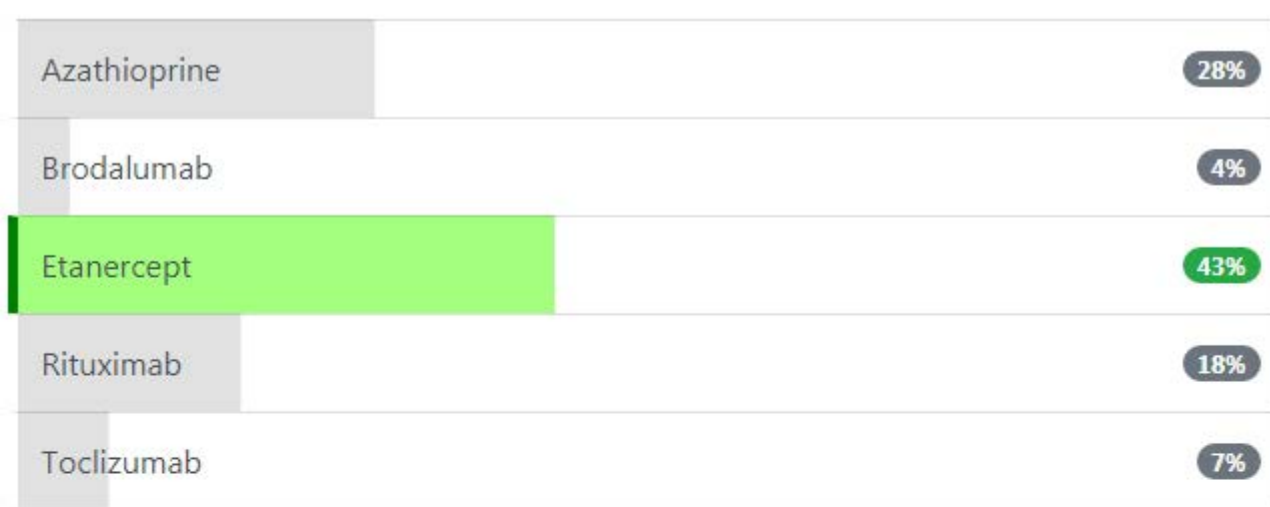
A 54-year-old man with significant psoriasis and related arthritis comes to the rheumatology clinic for review. Despite both NSAIDs and corticosteroids, his symptoms continue to worsen. On examination you can see both extensive plaque psoriasis, and deforming polyarthropathy leading to significant loss of function affecting both hands.

Investigations

Hb	123 g/l	Na ⁺	140 mmol/l
Platelets	321 * 10 ⁹ /l	K ⁺	4.2 mmol/l
WBC	10.1 * 10 ⁹ /l	Urea	6.7 mmol/l
Neuts	6.1 * 10 ⁹ /l	Creatinine	105 µmol/l
Lymphs	1.9 * 10 ⁹ /l	CRP	104 mg/l
Eosin	# * 10 ⁹ /l	ESR	70 mm/hr

Which of the following is the most appropriate next step?

- ☐ Azathioprine
- ☐ Brodalumab
- ☐ Etanercept
- ☐ Rituximab
- ☐ Tocilizumab



In this situation with uncontrolled psoriasis and psoriatic arthritis, early instigation of a biological is recommended. TNF alpha is a pro-inflammatory cytokine closely linked to the severity of psoriasis, and etanercept, a TNF alpha antagonist is the most appropriate intervention. Tuberculosis and viral hepatitis should be ruled out prior to starting therapy.

Although azathioprine does impact on disease severity in psoriasis, in this situation it's more important to gain disease control early, and therefore etanercept is the preferred intervention. Brodalumab is an anti-IL17 monoclonal antibody which has completed registration trials for psoriasis. It's likely to be reserved however for patients who fail to gain control on other interventions. Rituximab is an anti-CD20 antibody more commonly used in the treatment of rheumatoid arthritis, as is tocilizumab which targets IL6.

A 54-year-old lady attends with a rash. She describes a facial rash present for several weeks associated with flushing. On examination, there is erythematous papulopustular rash with telangiectasia across both cheeks and nose. Given the likely diagnosis, which associated complication may she also have?

- ☐ Blepharitis
- ☐ Parotitis
- ☐ Vulvovaginitis
- ☐ Pancreatitis
- ☐ Pericarditis

Blepharitis	64%
Parotitis	8%
Vulvovaginitis	7%
Pancreatitis	8%
Pericarditis	13%

Acne rosacea

- chronic skin condition which causes persistent facial flushing, erythema, telangiectasia, pustules, papules and rhinophyma
- It can also affect the eyes causing blepharitis, keratitis, conjunctivitis
- It is treated with topical antibiotics e.g. metronidazole gel or oral tetracycline (especially if ocular symptoms).

A 45-year-old man with a history of seborrhoeic dermatitis presents in late winter due a flare in his symptoms, affecting both his face and scalp. Which one of the following agents is least likely to be beneficial?

- ☐ Topical ketoconazole
- ☐ Selenium sulphide shampoo
- ☐ Topical hydrocortisone
- ☐ Tar shampoo
- ☐ Aqueous cream

Topical ketoconazole

14%

Selenium sulphide shampoo

8%

Topical hydrocortisone

16%

Tar shampoo

18%

Aqueous cream

43%

There is less of a role for emollients in the management of seborrhoeic dermatitis than in other chronic skin disorders

A 59-year-old patient presents to dermatology outpatients clinic with a three-month history of discolouration of the skin on his back. On examination, there are patchy areas of mild hypopigmentation covering large areas of the back. You suspect a diagnosis of pityriasis versicolor. What is the likely causative organism?

- ☐ *Epidermophyton*
- ☐ *Histoplasma capsulatum*
- ☐ *Micosporum*
- ☐ *Trichophyton*
- ☐ *Malassezia*



Pityriasis versicolor is caused by *Malassezia furfur*

Important for me ☒ Less important ☐

Pityriasis versicolour is caused by infection with *Malassezia* fungus. Initial treatment is with topical anti-fungals such as ketoconazole shampoo.

Microsporum, *Trichophyton* and *Epidermophyton* are dermatophytes and cause fungal nail infections and ringworm. *Histoplasma* is a fungi that can cause pneumonia in immuno-compromised patients.

A 62-year-old woman mentions in diabetes clinic that she has a 'volcano' like spot on her left cheek, which has appeared over the past 3 months. She initially thought it may be a simple spot but it has not gone away. On examination she has a 5 mm red, raised lesion with a central keratin filled crater. A clinical diagnosis of probable keratoacanthoma is made. What is the most suitable management?

- ☐ Reassure will spontaneously involute within 3 months
- ☐ Urgent referral to dermatology
- ☐ Topical 5-FU
- ☐ Non-urgent referral to dermatology
- ☐ Oral prednisolone

Reassure will spontaneously involute within 3 months

13%

Urgent referral to dermatology

46%

Topical 5-FU

21%

Non-urgent referral to dermatology

16%

Oral prednisolone

4%

Whilst keratoacanthoma is a benign lesion it is difficult clinically to exclude squamous cell carcinoma so urgent excision is advised

A 36-year-old woman is reviewed. She presented 4 weeks ago with itchy dry skin on her arms and was diagnosed as having atopic eczema. She was prescribed hydrocortisone 1% cream with an emollient. Unfortunately there has been no improvement in her symptoms. What is the next step in management, alongside continued regular use of an emollient?

- ☐ Betamethasone valerate 0.1%
- ☐ Clobetasone butyrate 0.05%
- ☐ Clobetasol propionate 0.05%
- ☐ Topical tetracycline
- ☐ Regular wet wraps

Betamethasone valerate 0.1%	32%
Clobetasone butyrate 0.05%	40%
Clobetasol propionate 0.05%	19%
Topical tetracycline	5%
Regular wet wraps	5%

Topical steroids

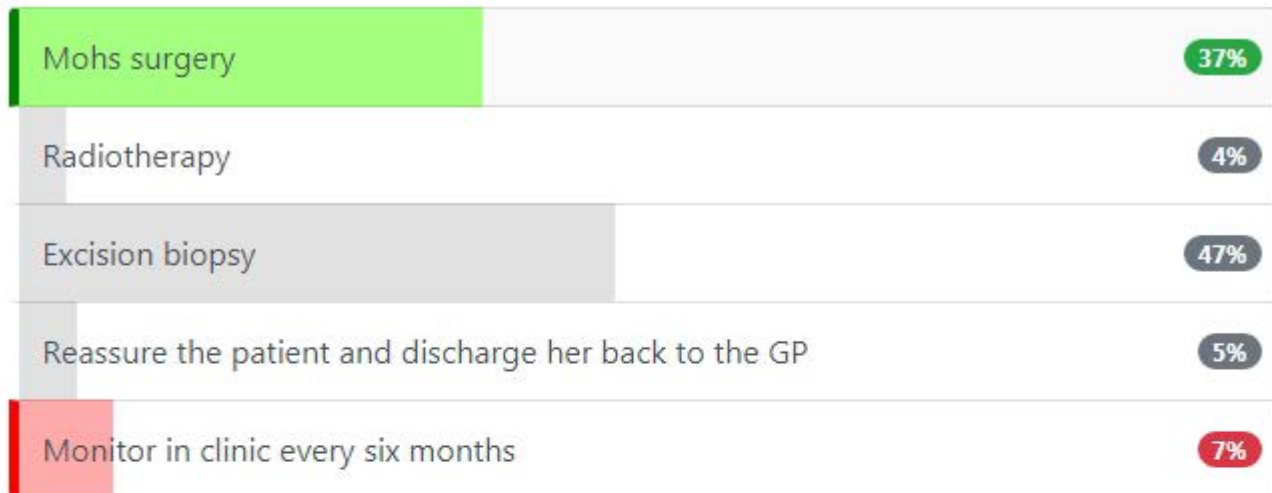
- moderate: Clobetasone butyrate 0.05%
- potent: Betamethasone valerate 0.1%
- very potent: Clobetasol propionate 0.05%

Important for me Less important

Clobetasone butyrate 0.05% is a moderately potent topical steroid and would be the most suitable next step in management. It is important to note the potency difference between two very similar sounding steroids - Clobetasone butyrate 0.05% (moderate) and Clobetasol propionate 0.05% (very potent)

You are working in dermatology. A 72-year-old lady has been referred to you by the GP. She says she can feel a firm patch of roughened skin overlying the left cheek which has been getting gradually larger in size. She thinks it has been there for at least a year. Her GP was not able to see any external features of ulceration, but felt there was a rough area over the left cheek. On examination there is a firm waxy area about 3 x 3 cm in size overlying the left cheek with ill-defined edges. How would you manage this lesion?

- ☐ Mohs surgery
- ☐ Radiotherapy
- ☐ Excision biopsy
- ☐ Reassure the patient and discharge her back to the GP
- ☐ Monitor in clinic every six months



The diagnosis is a morphoeic basal cell carcinoma. These are a type of BCC which present with firm/rough/waxy patches often on the cheeks. They often have poorly defined edges. Whilst radiotherapy can be used to manage some basal or squamous cell carcinomas, Mohs surgery is the gold standard for treating these lesions.

As this lesion is a basal cell carcinoma it should be removed. Therefore answers 4 and 5 are wrong. An excision biopsy is not necessary as it is a clinical diagnosis. Mohs surgery will also confirm this diagnosis as well as treat the lesion by removing it fully until clear margins are present.

A 64-year-old woman presents with severe mucosal ulceration associated with the development of blistering lesions over her torso and arms. On examination the blisters are flaccid and easily ruptured when touched. What is the most likely diagnosis?

- ☐ Pemphigus vulgaris
- ☐ Pemphigoid
- ☐ Dermatitis herpetiformis
- ☐ Psoriasis
- ☐ Epidermolysis bullosa

Pemphigus vulgaris

64%

Pemphigoid

16%

Dermatitis herpetiformis

4%

Psoriasis

2%

Epidermolysis bullosa

13%

Blisters/bullae

- no mucosal involvement: bullous pemphigoid
- mucosal involvement: pemphigus vulgaris

Important for me Less important

A 43-year-old woman is referred to psychiatry following repeated episodes of hypomaniac behaviour interspersed with periods of depression. Her past medical history includes psoriasis and a deep vein thrombosis 11 years ago. Which one of the following medications is most likely to worsen her psoriasis?

☐ Sodium valproate

☐ Quetiapine

☐ Lithium

☐ Valproaic acid

☐ Fluoxetine

Sodium valproate

14%

Quetiapine

8%

Lithium

62%

Valproaic acid

7%

Fluoxetine

9%

Psoriasis: lithium may trigger an exacerbation

Important for me Less important

A 24-year-old student presents due to some lesions on his lower abdomen. These have been present for the past six weeks. Initially, there was one lesion but since that time more lesions have appeared. On examination around 10 lesions are seen; they are raised, around 1-2mm in diameter and have an umbilicated appearance. What is the most likely diagnosis?

- ☐ Genital warts
- ☐ Lichen planus
- ☐ Keratosis pilaris
- ☐ Molluscum contagiosum
- ☐ Folliculitis



This is a classical description of molluscum contagiosum, although it is most commonly seen in children.

A 62-year-old female is referred to dermatology due to a lesion over her shin. It initially started as a small red papule which later became a deep, red, necrotic ulcer with a violaceous border. What is the likely diagnosis?

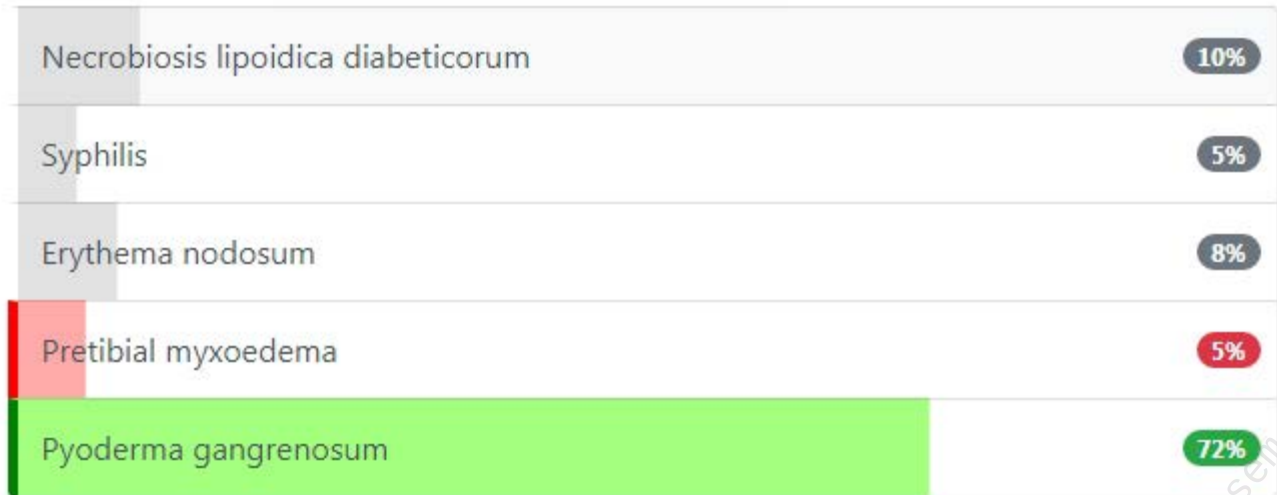
☐ Necrobiosis lipoidica diabetorum

☐ Syphilis

☐ Erythema nodosum

☐ Pretibial myxoedema

☐ Pyoderma gangrenosum



This is a classic description of pyoderma gangrenosum

A 78-year-old man is admitted from a nursing home with multi-infarct dementia, chronic obstructive pulmonary disease and biventricular failure. You are asked to assess his risk of pressure sores and need for referral to the tissue viability team during his inpatient stay.

Which of the following is most useful in determining the risk of pressure sores?

- ☐ Glasgow criteria
- ☐ Rankin scale
- ☐ Ransom criteria
- ☐ Waterlow scale
- ☐ Townsend scale

Glasgow criteria	3%
Rankin scale	6%
Ransom criteria	4%
Waterlow scale	83%
Townsend scale	4%

The Waterlow scale was developed in 1985 to assess the risk of pressure sore development, helping to drive level of nursing intervention and use of special mattresses to reduce risk. Potential scores range from 1-64. A score greater than 10 indicates an increased risk of pressure sore development, with scores >15 indicating high risk and >20 indicating very high risk. A number of factors are taken into account when assessing patients using the scale including body habitus, continence status, malnutrition, mobility, neurological status and presence of major trauma.

The Glasgow and Ransom criteria were drawn up to stratify risk in patients presenting with acute pancreatitis, with respect to identifying those at increased risk of mortality, and those who need to be treated in a high dependency area.

The Rankin scale relates to the degree of disability in patients post stroke, and the Townsend scale is an indicator of deprivation.

A 25-year-old male presents with extensive patches of altered pigmentation on his front, back, face and thighs. There is mild pruritus. A diagnosis of extensive pityriasis versicolor is made. What is the most appropriate management?

- ☐ Oral metronidazole
- ☐ Topical terbinafine
- ☐ Topical ketoconazole 2% shampoo
- ☐ Topical selenium sulphide
- ☐ Oral terbinafine

Oral metronidazole

8%

Topical terbinafine

19%

Topical ketoconazole 2% shampoo

40%

Topical selenium sulphide

12%

Oral terbinafine

21%

Ketoconazole shampoo is used to treat pityriasis versicolor

Important for me Less important

Topical ketoconazole 2% shampoo should be tried first-line. If there is a failure to respond then systemic therapy may be indicated in this case

A 50-year-old man presents with shiny, flat-topped papules on the palmar aspect of the wrists. He is mainly bothered by the troublesome and persistent itching. A diagnosis of lichen planus is suspected. What is the most appropriate treatment?

- ☐ Refer for punch biopsy
- ☐ Emollients + oral antihistamine
- ☐ Topical dapsone
- ☐ Topical clotrimazole
- ☐ Topical clobetasone butyrate

Refer for punch biopsy

6%

Emollients + oral antihistamine

17%

Topical dapsone

17%

Topical clotrimazole

9%

Topical clobetasone butyrate

52%

A 65-year-old woman with blistering lesions on her leg is diagnosed as having bullous pemphigoid. What is the most appropriate initial management?

- ☐ Reassurance
- ☐ Topical corticosteroids
- ☐ Oral itraconazole
- ☐ Screen for solid-tumour malignancies
- ☐ Oral corticosteroids

Reassurance

9%

Topical corticosteroids

22%

Oral itraconazole

5%

Screen for solid-tumour malignancies

8%

Oral corticosteroids

55%

Each of the following drugs may be used in psoriasis, except:

☐ Interferon alpha

☐ Infliximab

☐ Retinoids

☐ Methotrexate

☐ Ciclosporin

Interferon alpha

46%

Infliximab

10%

Retinoids

26%

Methotrexate

7%

Ciclosporin

10%

A 25-year-old man presents with a widespread rash over his body. The torso and limbs are covered with multiple erythematous lesions less than 1 cm in diameter which in parts are covered by a fine scale. You note that two weeks earlier he was seen with a sore throat when it was noted that he had exudative tonsillitis. Other than a history of asthma he is normally fit and well. What is the most likely diagnosis?

- ☐ Pityriasis rosea
- ☐ Pityriasis versicolor
- ☐ Syphilis
- ☐ Discoid eczema
- ☐ Guttate psoriasis

Pityriasis rosea

11%

Pityriasis versicolor

8%

Syphilis

4%

Discoid eczema

8%

Guttate psoriasis

69%

Which one of the following factors would predispose a patient to forming keloid scars?

- ☐ Having white skin
- ☐ Incisions along relaxed skin tension lines
- ☐ Being aged 20-40 years
- ☐ Being female
- ☐ Having a wound on the lower back

Having white skin

6%

Incisions along relaxed skin tension lines

25%

Being aged 20-40 years

40%

Being female

16%

Having a wound on the lower back

14%

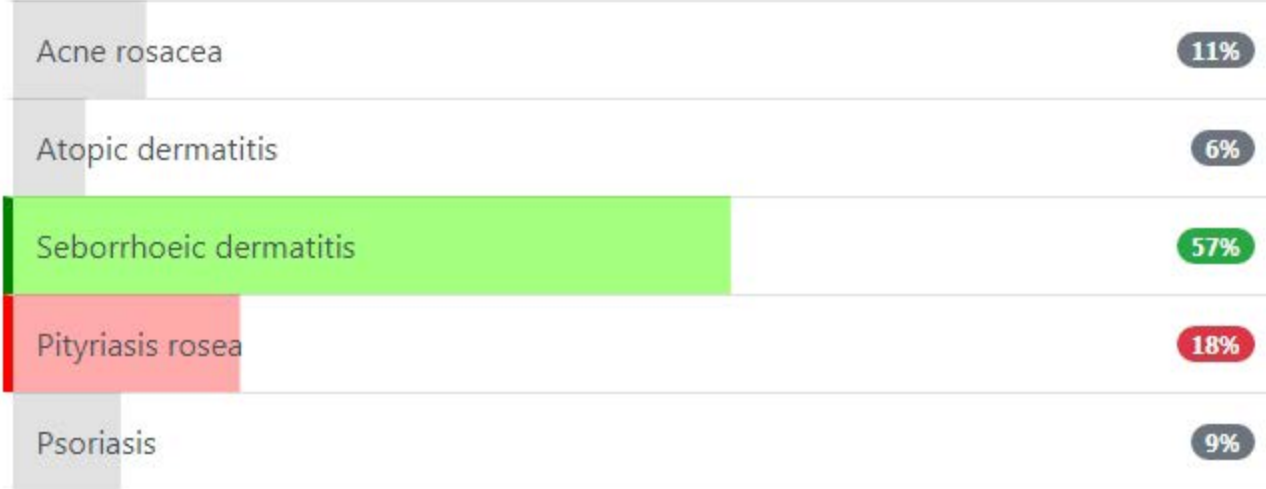
Keloid scars - more common in young, black, male adults

Important for me

Less important

A 35-year-old man presents with an itchy, scaly rash that has gradually developed over the past few months. He is normally fit and well and the only past medical history of note is generalised anxiety disorder. On examination he has a number of ill-defined, pink coloured patches with a yellow/brown scale. The main affected areas are the sternum, eyebrows and the nasal bridge. What is the most likely diagnosis?

- ☐ Acne rosacea
- ☐ Atopic dermatitis
- ☐ Seborrhoeic dermatitis
- ☐ Pityriasis rosea
- ☐ Psoriasis



An itchy rash affecting the face and scalp distribution is commonly caused by seborrhoeic dermatitis

Important for me Less important

The distribution is very typical for seborrhoeic dermatitis. Atopic dermatitis presents more commonly in the flexural areas and does not have the same characteristic scale.

Pityriasis rosea typically presents with a herald patch (usually on trunk) followed by erythematous, oval, scaly patches which follow a characteristic distribution with the longitudinal diameters of the oval lesions running parallel to the line of Langer. This may produce a 'fir-tree' appearance.

A 24-year-old female with a history of anorexia nervosa presents with red crusted lesions around the corner of her mouth and below her lower lip. What is she most likely to be deficient in?

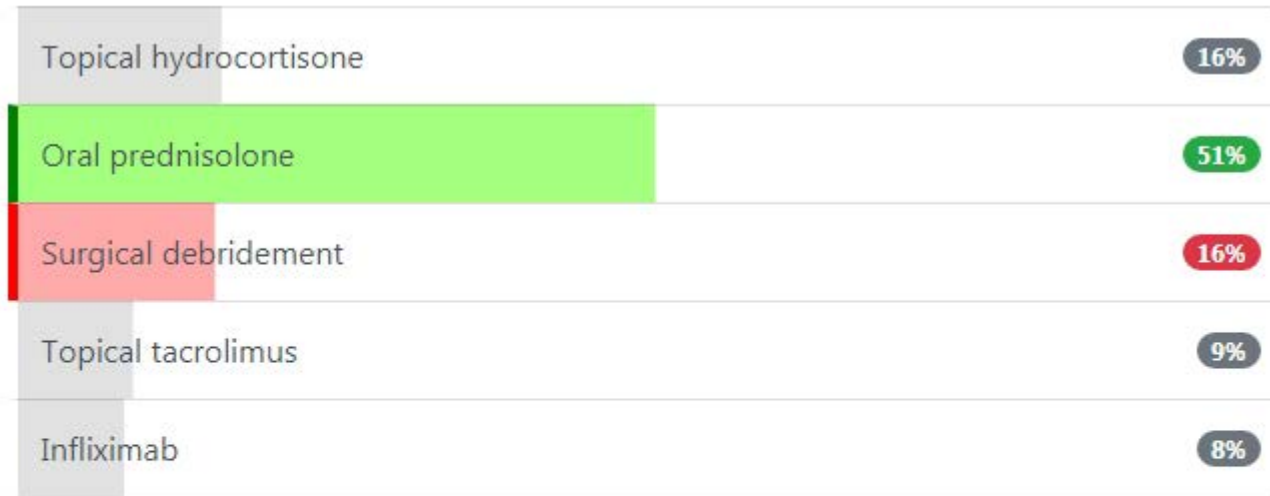
- ☐ Zinc
- ☐ Tocopherol
- ☐ Pantothenic acid
- ☐ Thiamine
- ☐ Magnesium



Vitamin B2 (riboflavin) deficiency may also cause angular cheilosis.

A 36-year-old female with a history of ulcerative colitis is diagnosed as having pyoderma gangrenosum. She presented 4 days ago with a 1 cm lesion on her right shin which rapidly ulcerated and is now painful. What is the most appropriate management?

- ☐ Topical hydrocortisone
- ☐ Oral prednisolone
- ☐ Surgical debridement
- ☐ Topical tacrolimus
- ☐ Infliximab



Topical therapy does have a role in pyoderma gangrenosum and it may seem intuitive to try this first before moving on to systemic treatment. However, pyoderma gangrenosum has the potential to evolve rapidly and for this reason oral prednisolone is usually given as initial treatment. For a review see BMJ 2006;333:181-184

A 72-year-old man is investigated for oral ulceration. A biopsy suggests pemphigus vulgaris. This is most likely to be caused by antibodies directed against:

☐ Hemidesmosomal BP180

☐ Occludin-2

☐ Hemidesmosomal BP230

☐ Desmoglein

☐ Adherens

Hemidesmosomal BP180

10%

Occludin-2

5%

Hemidesmosomal BP230

18%

Desmoglein

60%

Adherens

7%

A 35-year-old man presents with anaemia. On further questioning, you find that he has a lifelong history of recurrent, severe nosebleeds and characteristic erythematous spots around his lips, which blanch when pressed. What is the most likely diagnosis?

- ☐ von Hippel-Lindau
- ☐ Peutz-Jeghers syndrome
- ☐ Neurofibromatosis type 1
- ☐ Hereditary haemorrhagic telangiectasia
- ☐ Granulomatosis with polyangiitis

von Hippel-Lindau	6%
Peutz-Jeghers syndrome	16%
Neurofibromatosis type 1	3%
Hereditary haemorrhagic telangiectasia	68%
Granulomatosis with polyangiitis	6%

The key is in the recognition of the telangiectasias, which are often found on the skin of the lips, nose and fingers. With this and the epistaxis, two of the three criteria to diagnose Hereditary Haemorrhagic Telangiectasia (HHT) are met. Anaemia is a common complaint in those with HHT. It is due to epistaxis or otherwise asymptomatic GI tract bleeding. Another finding could be hypoxia due to pulmonary arteriovenous malformations. The exact features vary, depending on where the arteriovenous malformations are located.

Von Hippel-Lindau disease is caused by a faulty tumour suppressor gene resulting in the development of multiple unusual tumours including haemangioblastoma, pheochromocytoma or renal cell carcinoma. At least two tumours must be present to make the diagnosis in someone without a family history (compared to just one when a family history is present).

Peutz Jeghers syndrome is a disorder causing large numbers of polyps in the intestine which become cancerous in a majority of patients. They have pigmented lesions around the lips which are not telangiectasia. There is no history of epistaxis.

Neurofibromatosis Type 1 is benign tumour disorder. Despite the non-malignant nature of the tumours, they can have severe consequences depending on the location. Optic gliomas can lead to blindness, neurofibromas (found in the peripheral nervous system) can lead to learning disabilities and epilepsy. Other characteristic findings include café-au-lait spots (flat, hyperpigmented, brown cutaneous lesions), axillary freckling, Lisch nodules (on the iris) and dermal neurofibromas (small, rubbery, cutaneous lumps).

Granulomatosis with polyangiitis is a small- and medium-vessel vasculitis which primarily affects the sinuses, kidneys and lungs. Sinus dysfunction is the most common initial symptom causing nasal congestion or epistaxis. If a rash is present, it is usually made up of palpable purpura from small vessel inflammation.

A 41-year-old man develops itchy, polygonal, violaceous papules on the flexor aspect of his forearms. Some of these papules have coalesced to form plaques. What is the most likely diagnosis?

- ☐ Lichen planus
- ☐ Scabies
- ☐ Lichen sclerosis
- ☐ Morphea
- ☐ Psoriasis

Lichen planus

68%

Scabies

5%

Lichen sclerosus

10%

Morphea

6%

Psoriasis

11%

Lichen

- **p**lanus: **p**urple, **p**ruritic, **p**apular, **p**olygonal rash on flexor surfaces. Wickham's striae over surface. Oral involvement common
- sclerosus: itchy white spots typically seen on the vulva of elderly women

Important for me Less important

A 74-year-old woman develops tense, itchy blisters on her inner thighs and upper arms. Given the likely diagnosis, what will immunofluorescence of the skin biopsy demonstrate?

- ☐ Loss of fibrinogen at the basement membrane
- ☐ Granular IgG along the basement membrane
- ☐ IgM crystallization at the dermal junctions
- ☐ Linear IgA deposits at the dermoepidermal junction
- ☐ IgG and C3 at the dermoepidermal junction

Loss of fibrinogen at the basement membrane

8%

Granular IgG along the basement membrane

11%

IgM crystallization at the dermal junctions

6%

Linear IgA deposits at the dermoepidermal junction

29%

IgG and C3 at the dermoepidermal junction

46%

A 72-year-old woman is diagnosed with a number of erythematous, rough lesions on the back of her hands. A diagnosis of actinic keratoses is made. What is the most appropriate management?

- ☐ Reassurance
- ☐ Urgent referral to a dermatologist
- ☐ Topical fluorouracil cream
- ☐ Review in 3 months
- ☐ Topical betnovate

Reassurance

12%

Urgent referral to a dermatologist

22%

Topical fluorouracil cream

50%

Review in 3 months

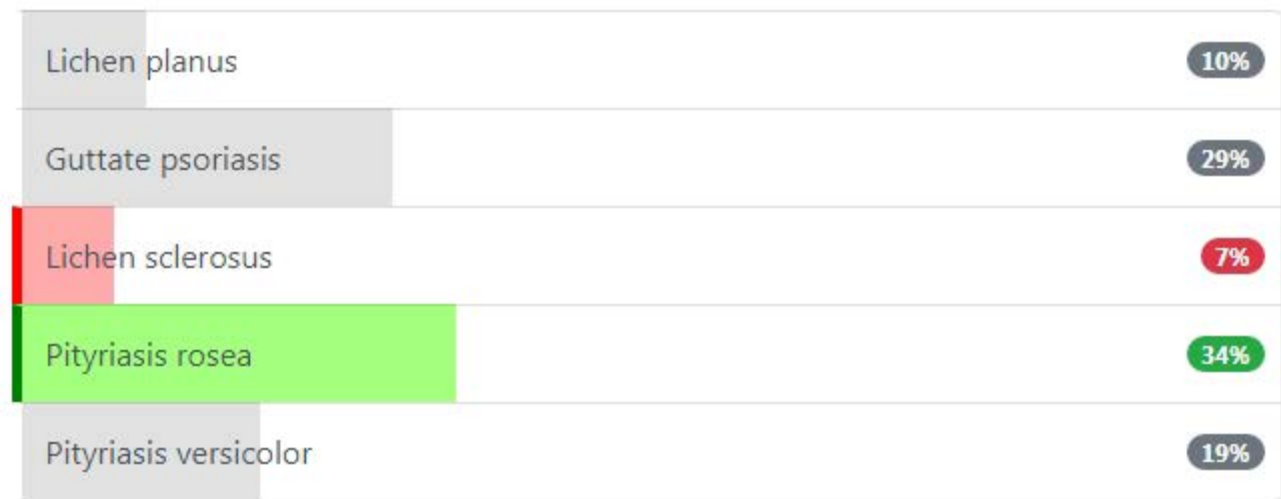
8%

Topical betnovate

9%

A 26-year-old male presents with a rash. Examination reveals erythematous oval lesions on his back and upper arms which have a slight scale just inside the edge. They vary in size from 1 to 5 cm in diameter. What is the most likely diagnosis?

- ☐ Lichen planus
- ☐ Guttate psoriasis
- ☐ Lichen sclerosus
- ☐ Pityriasis rosea
- ☐ Pityriasis versicolor



The skin lesions seen in pityriasis rosea are generally larger than those found in guttate psoriasis and scaling is typically confined to just inside the edges

A 43-year-old presents with itchy lesions on the soles of both feet. These have been present for the past two months. On examination small blisters are seen with surrounding dry and cracked skin. What is the most likely diagnosis?

☐ Porphyria cutanea tarda

☐ Pustular psoriasis

☐ Pompholyx

☐ Bullous pemphigoid

☐ Pemphigus

Porphyria cutanea tarda

10%

Pustular psoriasis

17%

Pompholyx

51%

Bullous pemphigoid

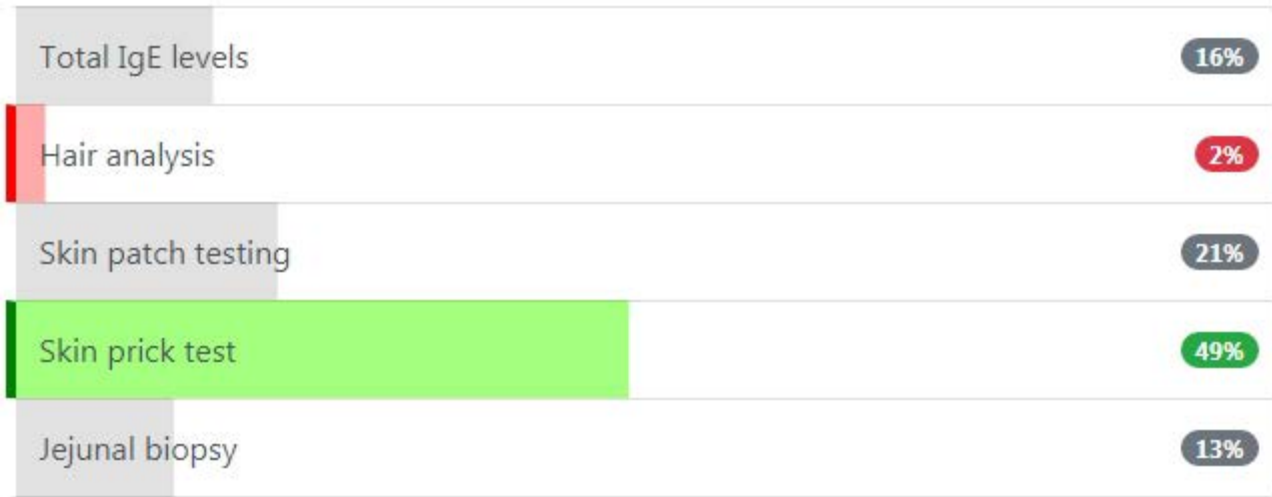
13%

Pemphigus

8%

A 25-year-old man presents with bloating and alteration in his bowel habit. He has been keeping a food diary and feels his symptoms may be secondary to a food allergy. Blood tests show a normal full blood count, ESR and thyroid function tests. Anti-endomysial antibodies are negative. What is the most suitable test to investigate possible food allergy?

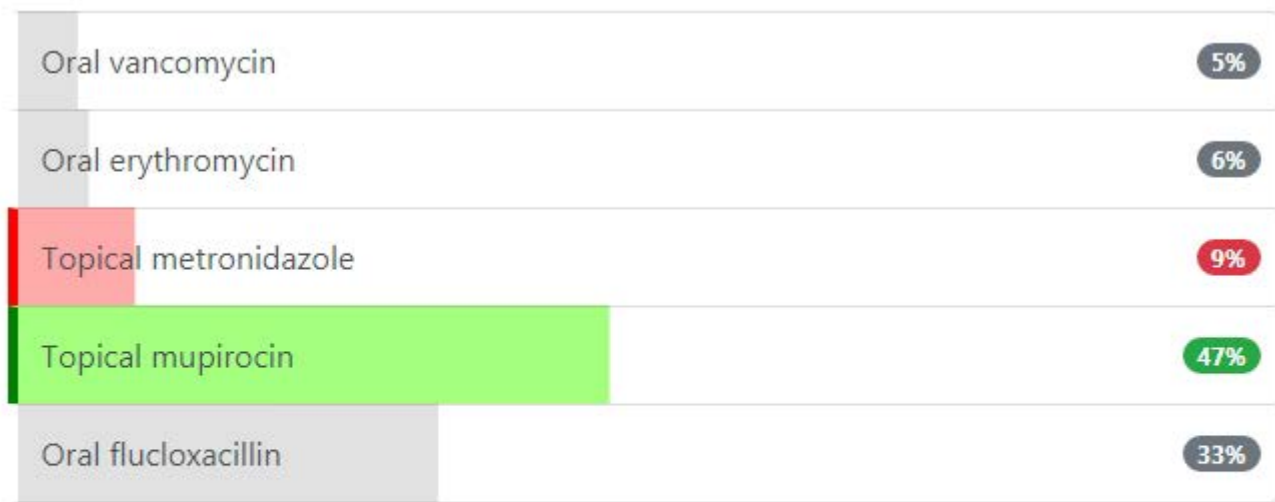
- ☐ Total IgE levels
- ☐ Hair analysis
- ☐ Skin patch testing
- ☐ Skin prick test
- ☐ Jejunal biopsy



Skin prick testing would be first-line here as it is inexpensive and a large number of allergens can be investigated. Whilst there is a role for IgE testing in food allergy it is in the form of specific IgE antibodies rather than total IgE levels.

A 54-year-old woman is prescribed topical fusidic acid for a small patch of impetigo around her nose. She has recently been discharged from hospital following varicose vein surgery. Seven days after starting treatment there has been no change in her symptoms. Examination reveals a persistent small, crusted area around the right nostril. Whilst awaiting the results of swabs, what is the most appropriate management?

- ☐ Oral vancomycin
- ☐ Oral erythromycin
- ☐ Topical metronidazole
- ☐ Topical mupirocin
- ☐ Oral flucloxacillin



MRSA should be considered given the recent hospital stay and lack of response to fusidic acid. Topical mupirocin is therefore the most appropriate treatment.

A 39-year-old female has a pigmented mole removed from her leg which histology shows to be a malignant melanoma. What is the single most important prognostic marker?

- ☐ Number of episodes of sunburn before the age of 18 years
- ☐ Age of patient
- ☐ Diameter of melanoma
- ☐ Depth of melanoma
- ☐ Mutation in the MC1R gene

A 39-year-old female has a pigmented mole removed from her leg which histology shows to be a malignant melanoma. What is the single most important prognostic marker?

Number of episodes of sunburn before the age of 18 years

3%

Age of patient

4%

Diameter of melanoma

9%

Depth of melanoma

76%

Mutation in the MC1R gene

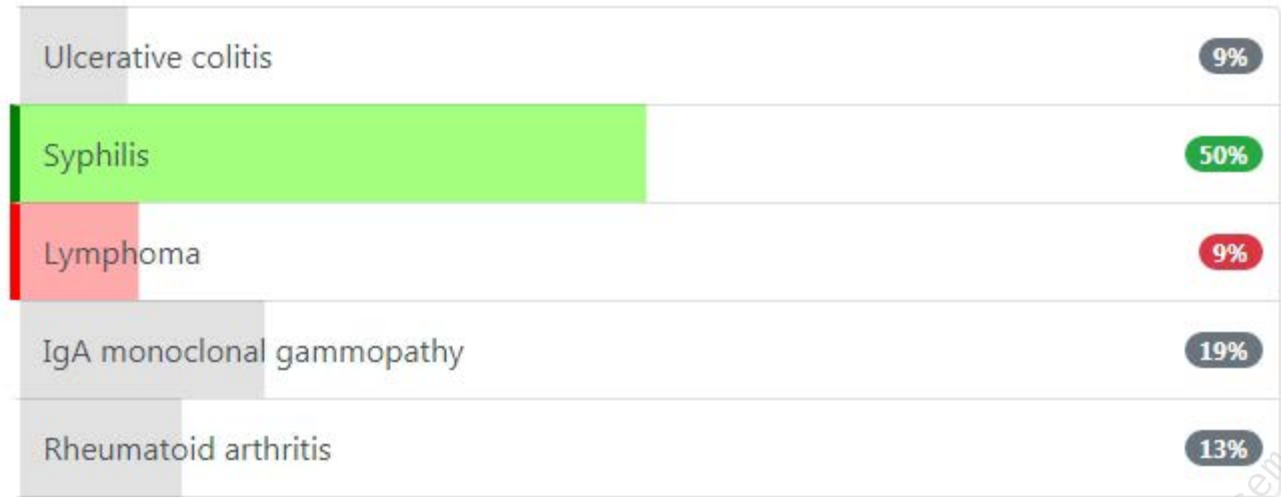
8%

Melanoma: the invasion depth of the tumour is the single most important prognostic factor

Important for me Less important

Which one of the following conditions is least likely to be associated with pyoderma gangrenosum?

- ☐ Ulcerative colitis
- ☐ Syphilis
- ☐ Lymphoma
- ☐ IgA monoclonal gammopathy
- ☐ Rheumatoid arthritis



Syphilis is not commonly associated with pyoderma gangrenosum

A 33-year-old male patient with a history of recurrent nose bleeds, iron-deficiency anaemia and dyspnoea is found to have a pulmonary AV malformation on pulmonary angiography. What is the likely underlying diagnosis?

- ☐ Haemophilia A
- ☐ Hereditary haemorrhagic telangiectasia
- ☐ Mantle cell lymphoma
- ☐ Wegener's granulomatosis
- ☐ Down's syndrome

Haemophilia A

3%

Hereditary haemorrhagic telangiectasia

74%

Mantle cell lymphoma

3%

Wegener's granulomatosis

16%

Down's syndrome

3%

A patient who is suspected of having dermatitis herpetiformis undergoes a skin biopsy. Which one of the following antibodies is most likely to be found in the dermis?

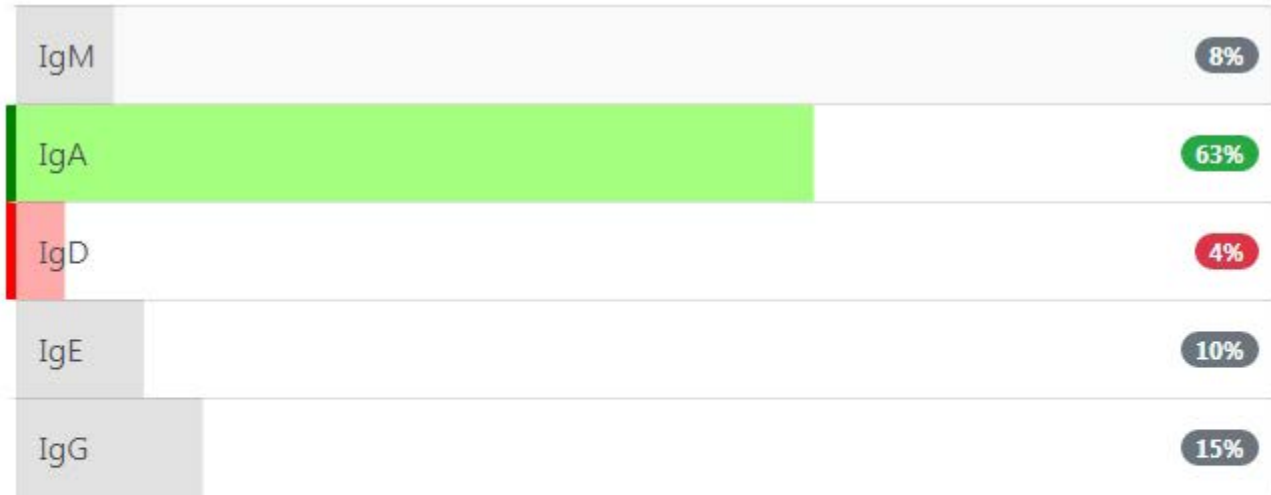
☐ IgM

☐ IgA

☐ IgD

☐ IgE

☐ IgG



Dermatitis herpetiformis - caused by IgA deposition in the dermis

Important for me

Less important

An elderly, frail woman is admitted to the ward following a fall at home. What is the most appropriate way to assess her risk of developing a pressure sore?

- ☐ PSST-6 score
- ☐ PAST score
- ☐ MUST score
- ☐ Waterlow score
- ☐ Honeywell score

PSST-6 score

8%

PAST score

5%

MUST score

8%

Waterlow score

74%

Honeywell score

4%

Waterlow score - used to identify patients at risk of pressure sores

Important for me Less important

A 45-year-old woman presents for review. She has noticed a number of patches of 'pale skin' on her hands over the past few weeks. The patient has tried using an emollient and topical hydrocortisone with no result. On examination, you note a number of depigmented patches on the dorsum of both hands. Her past medical history includes thyrotoxicosis for which she takes carbimazole and thyroxine.

What is the most likely cause of her symptoms?

- ☐ Vitiligo
- ☐ Carbimazole-induced hypopigmentation
- ☐ Leukopaenia-induced fungal infection
- ☐ Idiopathic guttate hypomelanosis
- ☐ Addison disease

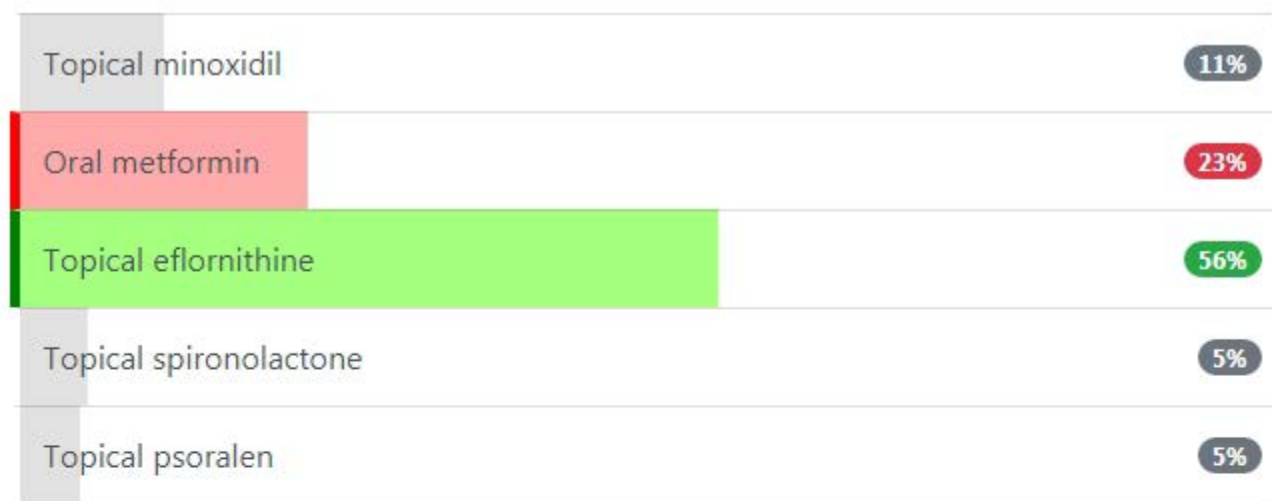
Vitiligo	73%
Carbimazole-induced hypopigmentation	14%
Leukopaenia-induced fungal infection	4%
Idiopathic guttate hypomelanosis	4%
Addison disease	4%

Vitiligo is more common in patients with known autoimmune conditions such as thyrotoxicosis. There is nothing else in the history to suggest Addison's disease.

A 25-year-old female patient presents to the dermatology clinic complaining of distressing symptoms of excessive facial hair growth. She has a history of the polycystic ovarian syndrome and has been on Yasmin. She has not found it to have significant benefit in her facial hair growth. This has caused her to lose her self-esteem greatly.

What medication would you recommend?

- ☐ Topical minoxidil
- ☐ Oral metformin
- ☐ Topical eflornithine
- ☐ Topical spironolactone
- ☐ Topical psoralen



Topical eflornithine is the treatment of choice for facial hirsutism

Important for me Less important

Topical eflornithine is the treatment of choice for facial hirsutism.

Minoxidil causes hypertrichosis.

Oral metformin does not affect hirsutism.

Spironolactone can be used to treat hirsutism but usually in oral form.

Psoralen is not used to treat hirsutism.

Dr Assem

A 38-year-old woman with a history of rheumatoid arthritis and epilepsy presents with generalised increased hair growth over her trunk and arms. Which one of the following drugs is associated with hypertrichosis?

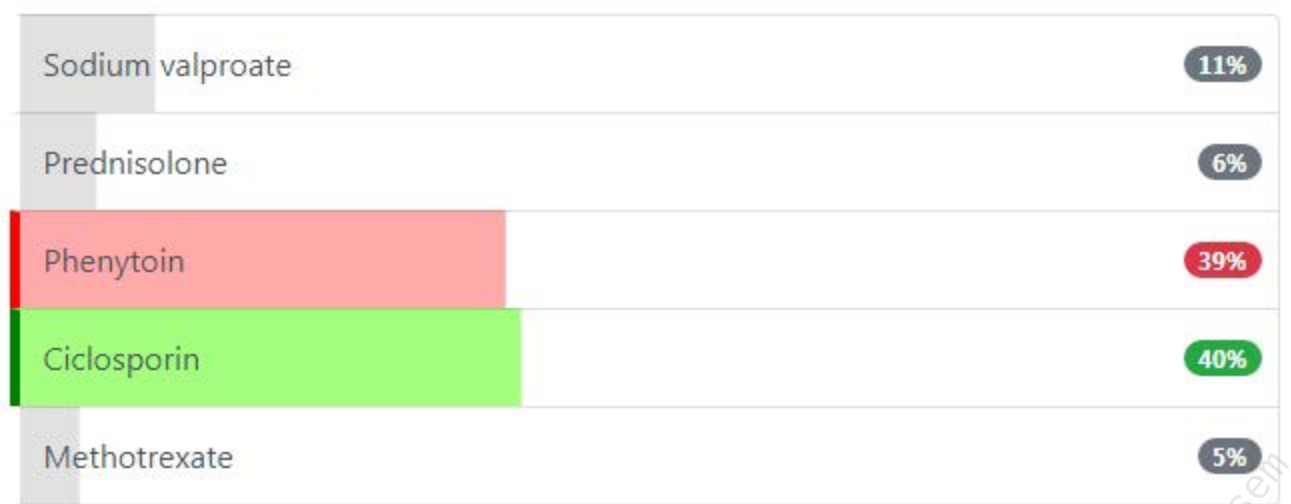
☐ Sodium valproate

☐ Prednisolone

☒ Phenytoin

☐ Ciclosporin

☐ Methotrexate



Phenytoin is associated with hirsutism rather than hypertrichosis

A 41-year-old man presents with a persistent itch rash that has been present for the past few weeks. On examination he has erythematous, scaly lesions underneath the eyebrows, around the nose and at the top of his chest. He also has a history of dandruff which is well controlled with over the counter shampoos. What is the most appropriate treatment for his face and trunk lesions?

- ☐ Topical metronidazole
- ☐ Oral oxytetracycline
- ☐ Oral isotretinoin
- ☐ Topical ketoconazole
- ☐ Topical hydrocortisone

Topical metronidazole

10%

Oral oxytetracycline

7%

Oral isotretinoin

5%

Topical ketoconazole

65%

Topical hydrocortisone

12%

Seborrhoeic dermatitis - first-line treatment is topical ketoconazole

Important for me Less important

The combination of a peri-orbital and nasolabial scaly rash associated dandruff is a classical history for seborrhoeic dermatitis.

A 62-year-old female is referred due to a long-standing ulcer above the right medial malleolus. Ankle-brachial pressure index readings are as follows:

Right	0.95
Left	0.95

To date it has been managed by the District Nurse with standard dressings. What is the most appropriate management to maximize the likelihood of the ulcer healing?

- ☐ Compression bandaging
- ☐ Intermittent pneumatic compression
- ☐ Hydrocolloid dressings
- ☐ Refer to vascular surgeon
- ☐ Topical flucloxacillin

Compression bandaging

61%

Intermittent pneumatic compression

9%

Hydrocolloid dressings

13%

Refer to vascular surgeon

13%

Topical flucloxacillin

4%

Management of venous ulceration - compression bandaging

Important for me Less important

The ankle-brachial pressure index readings indicate a reasonable arterial supply and suggest the ulcers are venous in nature.

A 63-year-old man who is known to have type 2 diabetes mellitus presents with a number of lesions over his shins. On examination there are a number of 3-4 mm smooth, firm, papules which are hyperpigmented and centrally depressed. What is the most likely diagnosis?

- ☐ Lupus vulgaris
- ☐ Necrobiosis lipoidica diabetorum
- ☐ Guttate psoriasis
- ☐ Granuloma annulare
- ☐ Pyoderma gangrenosum

Lupus vulgaris

3%

Necrobiosis lipoidica diabeticorum

43%

Guttate psoriasis

4%

Granuloma annulare

40%

Pyoderma gangrenosum

10%

A 34-year-old man presents with a three week history of an intensely itchy rash on the back of his elbows. On examination he has a symmetrical vesicular rash on the extensor aspects of his arms. Which one of the following antibodies is most likely to be positive?

- ☐ Anti-mitochondrial antibody
- ☐ Anti-gliadin antibody
- ☐ Anti-nuclear antibody
- ☐ Anti-neutrophil cytoplasmic antibody
- ☐ Anti-Jo-1 antibody

Anti-mitochondrial antibody

8%

Anti-gliadin antibody

56%

Anti-nuclear antibody

16%

Anti-neutrophil cytoplasmic antibody

9%

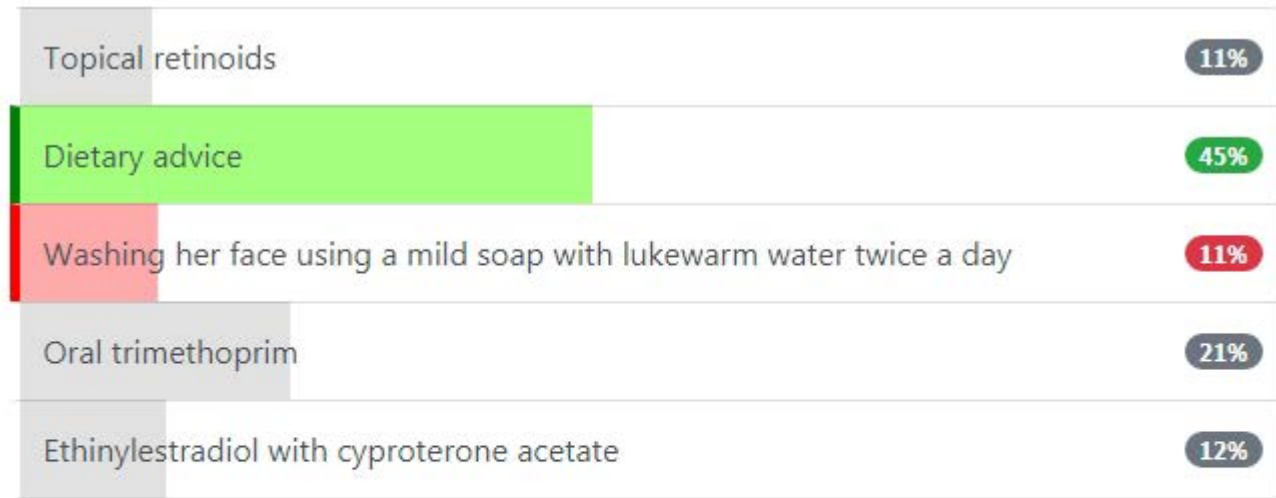
Anti-Jo-1 antibody

10%

Dr. Assem

A 17-year-old female presents with multiple comedones, pustules and papules on her face. Which one of the following is least likely to improve her condition?

- ☐ Topical retinoids
- ☐ Dietary advice
- ☐ Washing her face using a mild soap with lukewarm water twice a day
- ☐ Oral trimethoprim
- ☐ Ethinylestradiol with cyproterone acetate



There is no role for dietary modification in patients with acne vulgaris. Ethinylestradiol with cyproterone acetate (Dianette) is useful in some female patients with acne unresponsive to standard treatment. Oral trimethoprim is useful in patients on long-term antibiotics who develop Gram negative folliculitis

A 54-year-old woman with a history of type 1 diabetes mellitus presents with unsightly toenails affecting the lateral three nails of the left foot. On examination the nails are discoloured brown and break easily. Nail scrapings demonstrate *Trichophyton rubrum* infection. What is the treatment of choice?

- ☐ Oral terbinafine for 12 weeks
- ☐ Oral itraconazole for 4 weeks
- ☐ Topical itraconazole for 2 weeks
- ☐ Topical amorolfine for 6 weeks
- ☐ Oral itraconazole for 1 weeks

Oral terbinafine for 12 weeks

53%

Oral itraconazole for 4 weeks

17%

Topical itraconazole for 2 weeks

15%

Topical amorolfine for 6 weeks

9%

Oral itraconazole for 1 weeks

6%

Dermatophyte nail infections - use oral terbinafine

Important for me Less important

You review a 50-year-old man who has a history of ischaemic heart disease and psoriasis. Over the past two weeks he has experienced a significant worsening of the plaque psoriasis affecting his elbows and knees. His medications have recently been altered at the cardiology clinic. Which one of the following medications is most likely to have exacerbated his psoriasis?

☐ Nicorandil

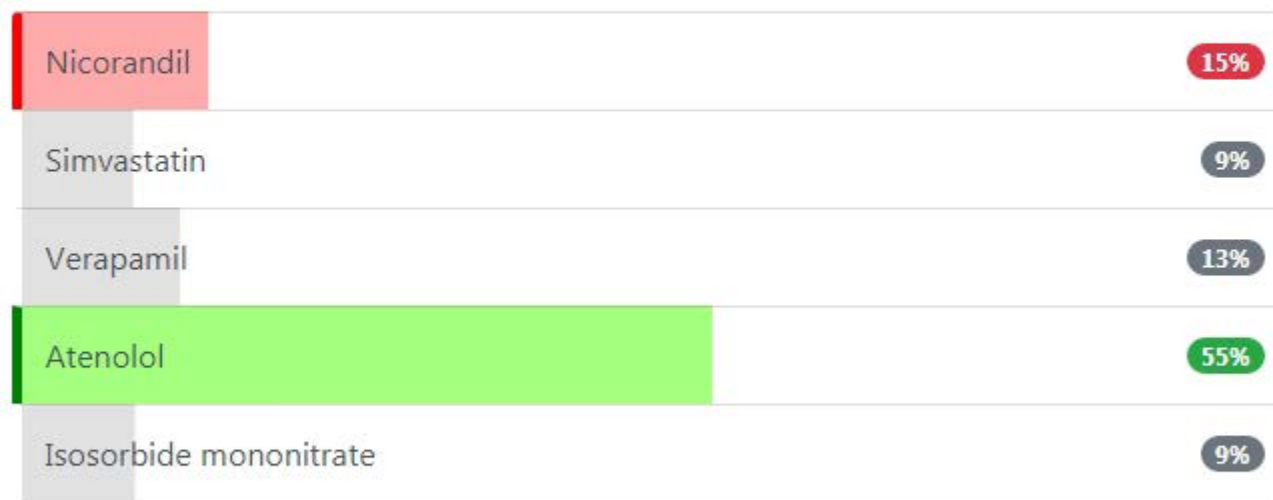
☐ Simvastatin

☐ Verapamil

☐ Atenolol

☐ Isosorbide mononitrate

You review a 50-year-old man who has a history of ischaemic heart disease and psoriasis. Over the past two weeks he has experienced a significant worsening of the plaque psoriasis affecting his elbows and knees. His medications have recently been altered at the cardiology clinic. Which one of the following medications is most likely to have exacerbated his psoriasis?



Beta-blockers are known to exacerbate plaque psoriasis

Important for me Less important

An 84-year-old woman with a history of ischaemic heart disease is reviewed in the dermatology clinic. Her current medication includes aspirin, simvastatin, bisoprolol, ramipril and isosorbide mononitrate. She has developed tense blistering lesions on her legs. Each lesion is around 1 to 3 cm in diameter and she reports that they are slightly pruritic. Examination of her mouth and vulva is unremarkable. What is the most likely diagnosis?

- ☐ Pemphigus
- ☐ Drug reaction to aspirin
- ☐ Epidermolysis bullosa
- ☐ Scabies
- ☐ Bullous pemphigoid

Pemphigus

13%

Drug reaction to aspirin

9%

Epidermolysis bullosa

15%

Scabies

4%

Bullous pemphigoid

60%

Blisters/bullae

- no mucosal involvement (in exams at least*): bullous pemphigoid
- mucosal involvement: pemphigus vulgaris

Important for me

Less important

A 43-year-old man is admitted to the Emergency Department with a rash and feeling generally unwell. He is known to have epilepsy and his medication was recently changed to phenytoin three weeks ago. Around one week ago he started to develop mouth ulcers associated with malaise and a cough. Two days ago he started to develop a widespread red rash which has now coalesced to form large fluid-filled blisters, covering around 30% of his body area. The lesions separate when slight pressure is applied. On examination his temperature is 38.3°C and pulse 126 / min. Blood results show:

Na ⁺	144 mmol/l
K ⁺	4.2 mmol/l
Bicarbonate	19 mmol/l
Urea	13.4 mmol/l
Creatinine	121 µmol/l

What is the most likely diagnosis?

- ☐ Phenytoin-induced neutropaenia
- ☐ Drug-induced lupus
- ☐ Kawasaki disease
- ☐ Toxic epidermal necrolysis
- ☐ Staphylococcal Scalded Skin syndrome

Phenytoin-induced neutropaenia

6%

Drug-induced lupus

7%

Kawasaki disease

4%

Toxic epidermal necrolysis

74%

Staphylococcal Scalded Skin syndrome

9%

A 19-year-old man is started on isotretinoin for severe nodulo-cystic acne. Which one of the following side-effects is most likely to occur?

- ☐ Low mood
- ☐ Thrombocytopaenia
- ☐ Raised plasma triglycerides
- ☐ Reversible alopecia
- ☐ Dry skin

Low mood

16%

Thrombocytopaenia

10%

Raised plasma triglycerides

14%

Reversible alopecia

8%

Dry skin

52%

Dry skin is the most common side-effect of isotretinoin

Important for me

Less important

Which one of the following features is least associated with zinc deficiency?

☐ Acrodermatitis

☐ Alopecia

☐ Short stature

☐ Perioral dermatitis

☐ Gingivitis



Gingivitis is more commonly seen in vitamin C deficiency

A 67-year-old retired gardener presents to the dermatology department with a suspicious evolving freckle on his face, which he first noticed 10 years ago. On examination, he has a 3cm asymmetric pigmented patch on his cheek, comprised of multiple shades of brown and black, and with asymmetrical thickening of the lesion. Which subtype of melanoma is this gentleman most likely to have?

☐ Superficial spreading melanoma

☐ Desmoplastic melanoma

☐ Lentigo maligna melanoma

☐ Acral lentiginous melanoma

☐ Nodular melanoma

Superficial spreading melanoma

25%

Desmoplastic melanoma

9%

Lentigo maligna melanoma

45%

Acral lentiginous melanoma

9%

Nodular melanoma

12%

Lentigo maligna melanoma: Suspicious freckle on face or scalp of chronically sun-exposed patients

Important for me [Less important](#)

Lentigo maligna is a precursor to lentigo maligna melanoma. It begins as a suspicious flat freckle which can grow over 5-20 years to develop into melanoma. It typically occurs in older people on chronically sun-exposed skin (e.g. with a career in gardening) and develops the characteristics of typical melanoma (asymmetry, border irregularity, colour variation, diameter >6mm, evolving). Once it has become melanoma, parts of the lesion may thicken as occurred in this gentleman, there may be increasing numbers of colours, ulceration, bleeding, itching and stinging.

Whilst nodular melanoma also presents on the face and neck, it is less likely given the presentation and the slow growth of the lesion.

Superficial spreading melanoma would also be a differential to consider in this gentleman, however, the location of the lesion and the chronic mild nature of the sun exposure better fits lentigo maligna.

(DermNet NZ)

A 65-year-old woman presents with bullae on her forearms following a recent holiday in Spain. She also notes that the skin on her hands is extremely fragile and tears easily. In the past the patient has been referred to dermatology due to troublesome hypertrichosis. What is the most likely diagnosis?

- ☐ Pellagra
- ☐ Pemphigus vulgaris
- ☐ Epidermolysis bullosa
- ☐ Bullous pemphigoid
- ☐ Porphyria cutanea tarda

Pellagra

3%

Pemphigus vulgaris

12%

Epidermolysis bullosa

16%

Bullous pemphigoid

15%

Porphyria cutanea tarda

55%

Porphyria cutanea tarda

- blistering photosensitive rash
- hypertrichosis
- hyperpigmentation

Important for me Less important

A 26-year-old man with a history of hereditary haemorrhagic telangiectasia is planning to start a family. What is the mode of inheritance?

- ☐ Autosomal dominant with incomplete penetrance
- ☐ Autosomal codominant
- ☐ Autosomal recessive with incomplete penetrance
- ☐ Autosomal dominant
- ☐ Autosomal recessive

Autosomal dominant with incomplete penetrance

16%

Autosomal codominant

8%

Autosomal recessive with incomplete penetrance

7%

Autosomal dominant

54%

Autosomal recessive

15%

Hereditary haemorrhagic telangiectasia - autosomal dominant

Important for me Less important

An 18-year-old female is reviewed in the dermatology clinic complaining of scalp hair loss. Which one of the following conditions is least likely to be responsible?

☐ Porphyrria cutanea tarda

☐ Discoid lupus

☐ Tinea capitis

☐ Alopecia areata

☐ Telogen effluvium

Porphyria cutanea tarda

54%

Discoid lupus

10%

Tinea capitis

8%

Alopecia areata

10%

Telogen effluvium

19%

Porphyria cutanea tarda is a recognised cause of hypertrichosis

Dr Assem

Which one of the following complications is most associated with psoralen + ultraviolet A light (PUVA) therapy?

- ☐ Squamous cell cancer
- ☐ Osteoporosis
- ☐ Basal cell cancer
- ☐ Dermoid cysts
- ☐ Malignant melanoma

Complication	Percentage
Squamous cell cancer	57%
Osteoporosis	4%
Basal cell cancer	18%
Dermoid cysts	5%
Malignant melanoma	16%

57%

Osteoporosis

4%

Basal cell cancer

18%

Dermoid cysts

5%

Malignant melanoma

16%

The most significant complication of PUVA therapy for psoriasis is squamous cell skin cancer.

A 25-year-old man presents with a pruritic skin rash. This has been present for the past few weeks and has responded poorly to an emollient cream. The pruritus is described as 'intense' and has resulted in him having trouble sleeping. On inspecting the skin you notice a combination of papules and vesicles on his buttocks and the extensor aspect of the knees and elbows. What is the most likely diagnosis?

- ☐ Lichen planus
- ☐ Chronic plaque psoriasis
- ☐ Henoch-Schonlein purpura
- ☐ Dermatitis herpetiformis
- ☐ Scabies

Lichen planus

10%

Chronic plaque psoriasis

10%

Henoch-Schonlein purpura

6%

Dermatitis herpetiformis

56%

Scabies

18%

Dr. Assef

A 34-year-old man with a history of polyarthralgia, back pain and diarrhoea is found to have a 3 cm red lesion on his shin which is starting to ulcerate. What is the most likely diagnosis?

- ☐ Systemic *Shigella* infection
- ☐ Syphilis
- ☐ Metastatic colon cancer
- ☐ Erythema nodosum
- ☐ Pyoderma gangrenosum

Systemic

Shigella

infection

6%

Syphilis

4%

Metastatic colon cancer

3%

Erythema nodosum

17%

Pyoderma gangrenosum

71%

This patient is likely to have ulcerative colitis, which has a known association with large-joint arthritis, sacroilitis and pyoderma gangrenosum

A 47-year-old lorry driver presents following the development of a widespread urticarial rash. This is associated with pruritus. What is the most appropriate medication to help relieve the itch?

- ☐ Cetirizine
- ☐ Loratadine
- ☐ Chlorphenamine
- ☐ Ranitidine
- ☐ Alimemazine

Antihistamine	Percentage
Cetirizine	25%
Loratadine	39%
Chlorphenamine	27%
Ranitidine	4%
Alimemazine	5%

25%

Loratadine

39%

Chlorphenamine

27%

Ranitidine

4%

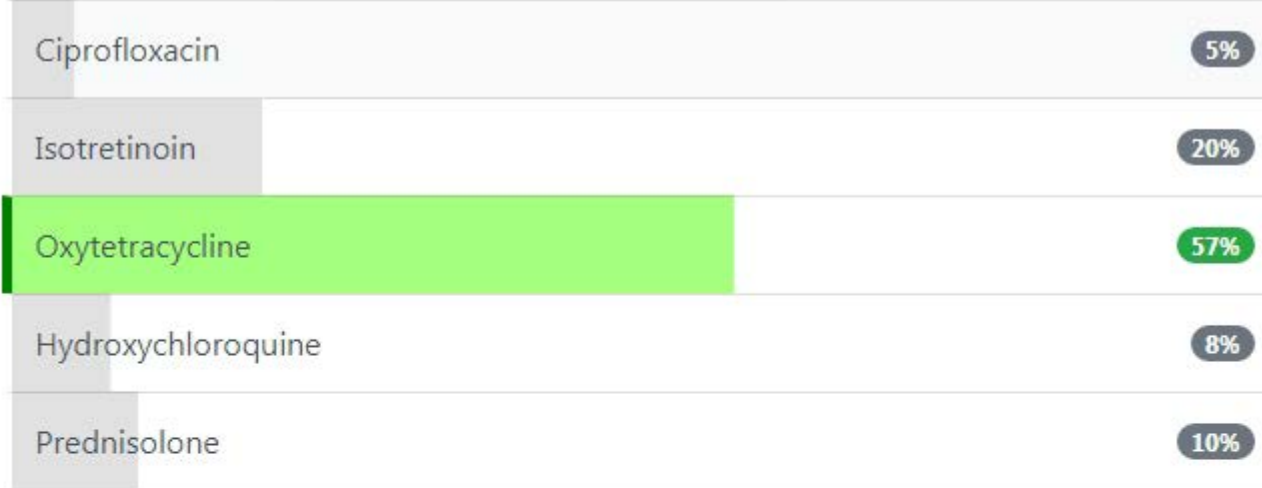
Alimemazine

5%

The obvious concern in a lorry driver is drowsiness. Of the non-sedating antihistamines there is some evidence that cetirizine causes more drowsiness than loratadine

A 54-year-old man is referred to the dermatology outpatient department due to a facial rash which has persisted for the past 12 months. On examination there is a symmetrical rash consisting of extensive pustules and papules which affects his nose, cheeks and forehead. What is the most appropriate treatment?

- ☐ Ciprofloxacin
- ☐ Isotretinoin
- ☐ Oxytetracycline
- ☐ Hydroxychloroquine
- ☐ Prednisolone



Acne rosacea treatment:

- mild/moderate: topical metronidazole
- severe/resistant: oral tetracycline

Important for me Less important

As there is extensive involvement oral oxytetracycline should probably be used rather than topical metronidazole

Which one of the following antibiotics is most associated with the development of Stevens-Johnson syndrome?

- ☐ Co-trimoxazole
- ☐ Ethambutol
- ☐ Chloramphenicol
- ☐ Ciprofloxacin
- ☐ Gentamicin

Co-trimoxazole

47%

Ethambutol

9%

Chloramphenicol

16%

Ciprofloxacin

19%

Gentamicin

8%

A 69-year-old woman with a history of learning difficulties is reviewed in clinic. She is known to have erythema ab igne on her legs but according to her carer still spends long hours in front of her electric fire. Which one of the following skin lesions is she at risk of developing?

- ☐ Squamous cell carcinoma
- ☐ Cutaneous T-cell lymphoma of the skin
- ☐ Dermatofibrosarcoma protuberans
- ☐ Basal cell carcinoma
- ☐ Malignant melanoma

Squamous cell carcinoma

63%

Cutaneous T-cell lymphoma of the skin

14%

Dermatofibrosarcoma protuberans

11%

Basal cell carcinoma

7%

Malignant melanoma

5%

A 63-year-old gentleman presents to his general practitioner. He has recently been diagnosed with melanoma after being referred to the dermatologist with a suspicious red lump on his face. He is awaiting further imaging to see if the melanoma has metastasised. After being told his subtype of melanoma, he researched further online. He is now very concerned as he has read that his subtype is the most aggressive subtype and that it metastasises early. Which subtype of melanoma is he likely to have?

- ☐ Actinic keratosis
- ☐ Lentigo maligna
- ☐ Acral lentiginous
- ☐ Nodular
- ☐ Superficial spreading

Actinic keratosis	6%
Lentigo maligna	28%
Acral lentiginous	14%
Nodular	43%
Superficial spreading	10%

Nodular melanoma: Invade aggressively and metastasise early

Important for me Less important

The presentation of this lesion is most consistent with nodular melanoma. Nodular melanoma is the most aggressive form of melanoma. This is because it tends to grow rapidly, downwards into the deeper layers of skin, increasing in thickness faster than in diameter.

The other forms of melanoma typically take longer to grow and metastasise. These are described in further detail in the notes below. Actinic keratosis is not a form of melanoma, but rather a pre-cancerous lesion.

(DermNet NZ)

Dr Assem

Which of the following skin conditions is not associated with diabetes mellitus?

☐ Necrobiosis lipoidica

☐ Sweet's syndrome

☐ Granuloma annulare

☐ Vitiligo

☐ Lipoatrophy

Necrobiosis lipoidica

5%

Sweet's syndrome

58%

Granuloma annulare

17%

Vitiligo

12%

Lipoatrophy

7%

Sweet's syndrome is also known as acute febrile neutrophilic dermatosis has a strong association with acute myeloid leukaemia. It is not associated with diabetes mellitus

A 23-year-old student is investigated following an anaphylactic reaction suspected to be secondary to a wasp sting. Which one of the following is the most appropriate first-line test to investigate the cause of the reaction?

- ☐ Hair analysis
- ☐ Radioallergosorbent test (RAST)
- ☐ Desensitization therapy
- ☐ Skin patch test
- ☐ Skin prick test

Hair analysis

4%

Radioallergosorbent test (RAST)

46%

Desensitization therapy

6%

Skin patch test

14%

Skin prick test

30%

Given the history of anaphylaxis it would not be appropriate to perform a skin prick test

A 19-year-old student presents with a three day history of a 1 cm golden, crusted lesion on the border of her lower lip. What is the most suitable management?

- ☐ Oral co-amoxiclav
- ☐ Oral penicillin
- ☐ Oral flucloxacillin
- ☐ Oral flucloxacillin + penicillin
- ☐ Topical fusidic acid



Impetigo - topical fusidic acid is first-line

Important for me Less important

This history is typical of impetigo. As the lesion is small and localised topical fusidic acid is recommended

A 49-year-old man is reviewed in the dermatology clinic complaining of losing hair. Examination reveals generalised scalp hair loss that does not follow the typical male-pattern distribution. Which one of the following medications is least likely to be responsible?

- ☐ Colchicine
- ☐ Cyclophosphamide
- ☐ Heparin
- ☐ Carbimazole
- ☐ Phenytoin



Phenytoin is a recognised cause of hirsutism, rather than alopecia

A 22-year-old woman presents due to hypopigmented skin lesions on her chest and back. She has recently returned from the south of France and has tanned skin. On examination the lesions are slightly scaly. What is the most likely diagnosis?

- ☐ Tinea corporis
- ☐ Pityriasis versicolor
- ☐ Porphyria cutanea tarda
- ☐ Lyme disease
- ☐ Psoriasis

Tinea corporis

8%

Pityriasis versicolor

71%

Porphyria cutanea tarda

12%

Lyme disease

3%

Psoriasis

5%

Pellagra is caused by a deficiency in:

- ☐ Vitamin B12
- ☐ Thiamine
- ☐ Nicotinic acid
- ☐ Vitamin B2
- ☐ Vitamin B6

Vitamin B12

5%

Thiamine

6%

Nicotinic acid

58%

Vitamin B2

15%

Vitamin B6

16%

Deficiency of niacin (B3) causes pellagra

Important for me Less important

A 45-year-old man has been referred to dermatology clinic due to a new rash. He is a keen gardener and has spent the majority of the summer tending to his outdoor plants. His background is notable for hepatitis C, COPD and hypertension. He notes this rash is worst on his hands, face and shoulders.

On examination you note blisters and erosions on his hands, forehead and upper back.

Which of the following tests would be most helpful in ascertaining a diagnosis?

- ☐ Direct immunofluorescent staining
- ☐ Varicella antibodies
- ☐ Urine uroporphyrinogen
- ☐ Serum porphobilinogen
- ☐ Anti tissue transglutaminase antibodies

Direct immunofluorescent staining

23%

Varicella antibodies

5%

Urine uroporphyrinogen

48%

Serum porphobilinogen

14%

Anti tissue transglutaminase antibodies

10%

Hepatitis C may lead to porphyria cutanea tarda

Important for me [Less important](#)

This blistering condition is porphyria cutanea tarda (PCT). It is associated with chronic hepatitis C and results in blisters and erosions in sun exposed areas. High levels of urine uroporphyrinogen are diagnostic. Serum (and urine) porphobilinogen are useful for the diagnosis of acute intermittent porphyria (AIP), an autosomal dominant condition that is characterised by neurological symptoms and abdominal pain.

Other conditions that can cause acantholysis include pemphigus vulgaris (for which answer 1 is useful) and dermatitis herpetiformis (for which answer 5 is useful).

Dr Assem

A 45-year-old woman presents with itchy, violaceous papules on the flexor aspects of her wrists. She is normally fit and well and has not had a similar rash previously. Given the likely diagnosis, what other feature is she most likely to have?

- ☐ Onycholysis
- ☐ Raised ESR
- ☐ Mucous membrane involvement
- ☐ Pain in small joints
- ☐ Microscopic haematuria

Onycholysis

17%

Raised ESR

15%

Mucous membrane involvement

49%

Pain in small joints

14%

Microscopic haematuria

5%

Lichen

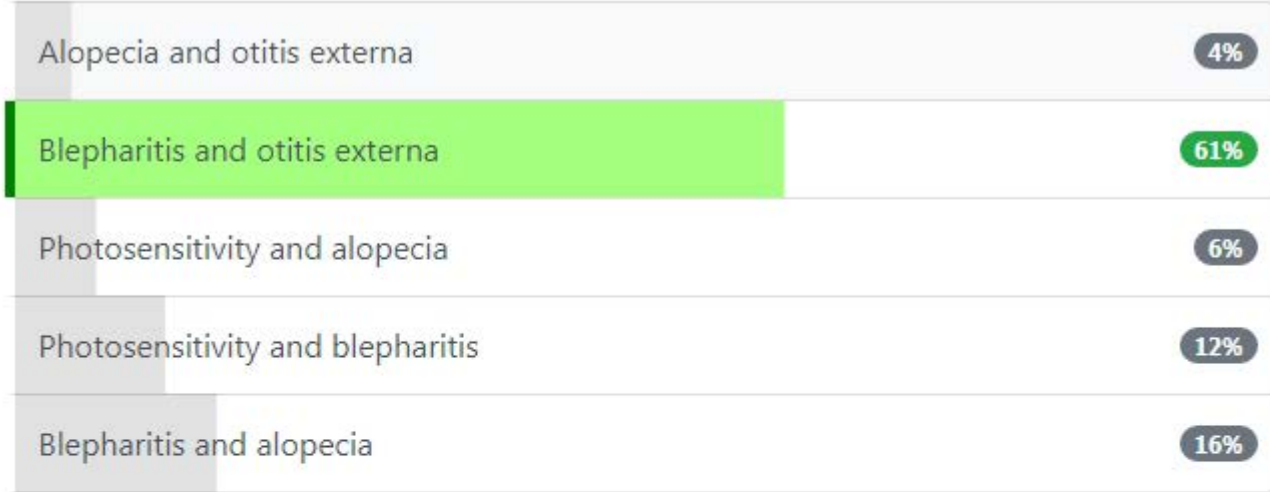
- **p**lanus: **p**urple, **p**ruritic, **p**apular, **p**olygonal rash on flexor surfaces. Wickham's striae over surface. Oral involvement common
- sclerosus: itchy white spots typically seen on the vulva of elderly women

Important for me Less important

Mucous membrane involvement is common in lichen planus

A 26-year-old man who is HIV positive is noted to have developed seborrhoeic dermatitis. Which of the following two complications are most associated with this condition?

- ☐ Alopecia and otitis externa
- ☐ Blepharitis and otitis externa
- ☐ Photosensitivity and alopecia
- ☐ Photosensitivity and blepharitis
- ☐ Blepharitis and alopecia



Otitis externa and blepharitis are common complications of seborrhoeic dermatitis

Important for me Less important

Alopecia is not commonly seen in seborrhoeic dermatitis, but may develop if a severe secondary infection develops

A 45-year-old man who presented with itchy lesions on his hands is diagnosed with scabies. It is decided to treat him with permethrin 5%. You have explained the need to treat all members of the household and hot wash all bedding and clothes. What advice should be given about applying the cream?

- ☐ From neck down + leave for 12 hours
- ☐ All skin including scalp + leave for 12 hours + retreat in 2 days
- ☐ All skin including scalp + leave for 12 hours + retreat in 7 days
- ☐ From neck down + leave for 4 hours
- ☐ From neck down + leave for 12 hours + retreat in 7 days

From neck down + leave for 12 hours

8%

All skin including scalp + leave for 12 hours + retreat in 2 days

11%

All skin including scalp + leave for 12 hours + retreat in 7 days

54%

From neck down + leave for 4 hours

4%

From neck down + leave for 12 hours + retreat in 7 days

24%

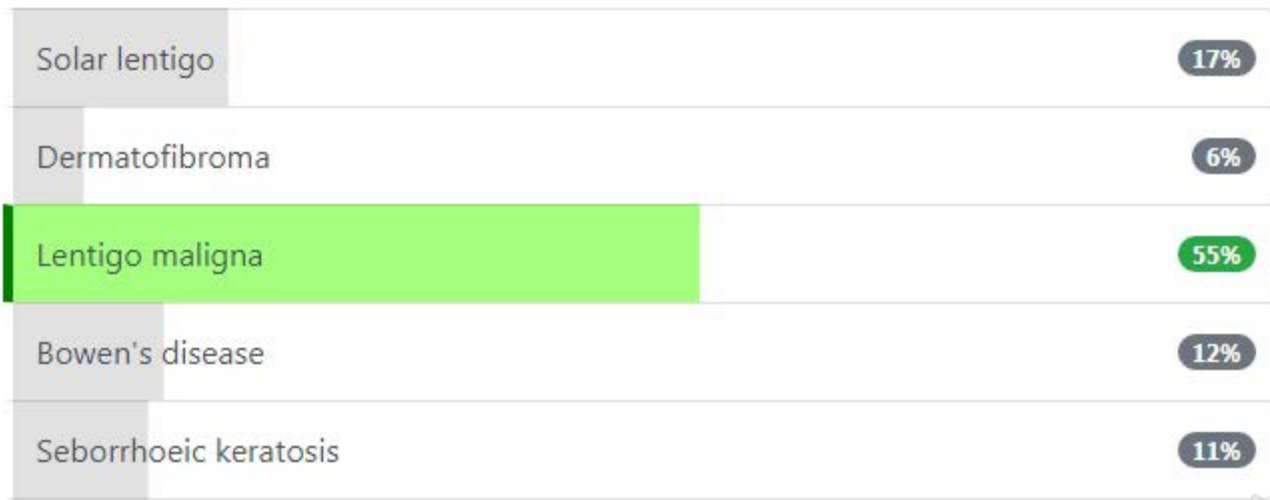
Scabies - permethrin treatment: all skin including scalp + leave for 12 hours + retreat in 7 days

Important for me Less important

The BNF advises to apply the insecticide to all areas, including the face and scalp, contrary to the manufacturer's recommendation (and common practice).

A 78-year-old woman asks you for cream to treat a lesion on her left cheek. It has been present for the past nine months and is asymptomatic. On examination you find a 2 * 3 cm area of flat brown pigmentation with a jagged, irregular edge. The pigmentation on the anterior aspect of the lesion is a darker brown. What is the most likely diagnosis?

- ☐ Solar lentigo
- ☐ Dermatofibroma
- ☐ Lentigo maligna
- ☐ Bowen's disease
- ☐ Seborrhoeic keratosis



These lesions often present a diagnostic dilemma. The asymmetrical nature of the lesion would however point away from a diagnosis of solar lentigo.

A 26-year-old female, of Han Chinese origin, with newly diagnosed partial epilepsy is commenced on carbamazepine and has an HLA B*1502. Two weeks later, she develops a maculopapular rash, purpuric macules and targetoid lesions; full-thickness epidermal necrosis, and mucous membrane involvement.. What is the predominant cell type involved in this reaction?

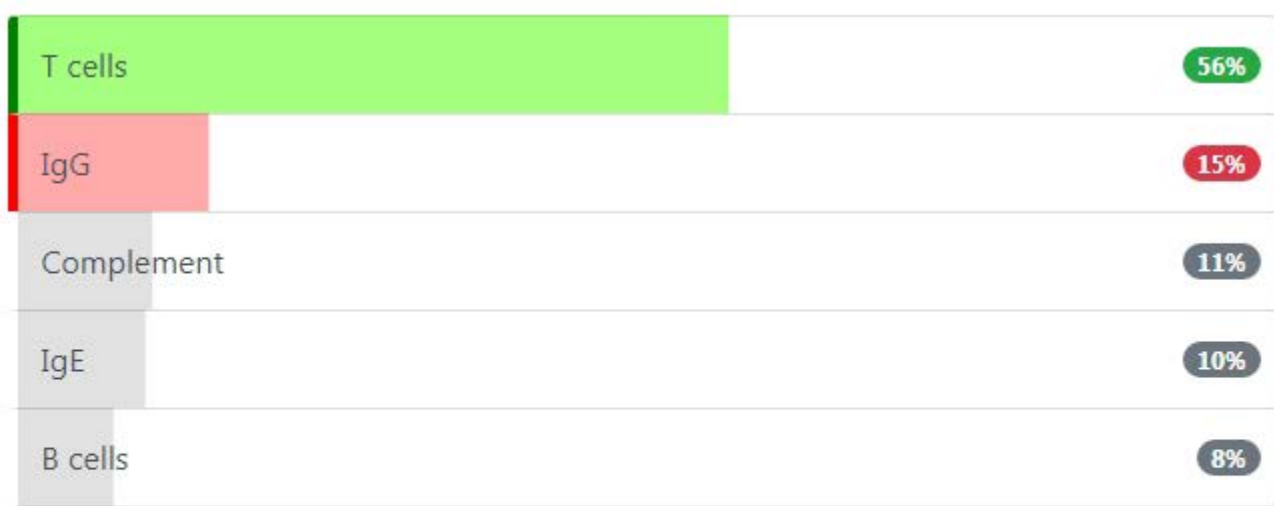
☐ T cells

☐ IgG

☐ Complement

☐ IgE

☐ B cells



HLA allele B*1502 as a marker for carbamazepine-induced Stevens-Johnson syndrome and toxic epidermal necrolysis in Han Chinese. Stevens-Johnson syndrome and toxic epidermal necrolysis is a delayed-hypersensitivity reaction, thus involving T-cells.

A 34-year-old man attends the emergency department with a rash on his legs which he says has been getting worse over the past two weeks. His GP started him on flucloxacillin one week ago. At the weekend he visited the emergency department as the rash was spreading; he was discharged with the addition of clarithromycin.

He has a past medical history of well-controlled asthma. He suffers occasional aches and pains in multiple joints but has never had any formal investigations for this problem. He takes no regular medications.

On examination his observations are stable and he is afebrile. He has a series of raised purple-red lumps on the anterior aspect of both his shins. They are painful and tender to touch.

The results of investigations are as follows:

Hb	144 g/l
Platelets	301 * 10 ⁹ /l
WBC	9.6 * 10 ⁹ /l
CRP	15 mg/L
Na ⁺	139 mmol/l
K ⁺	4.5 mmol/l
Ca ²⁺	2.5 mmol/l

The on call radiologist has authorised this report:

Chest X-ray	No focal consolidation seen, clear lung fields. Some bilateral hilar lymphadenopathy.
-------------	---

What is the most likely diagnosis?

☒ Sarcoidosis

☐ Cellulitis caused by MRSA

☐ Necrotising fasciitis

☐ Scrofuloderma (cutaneous tuberculosis)

☐ Erysipelas

Sarcoidosis	79%
Cellulitis caused by MRSA	5%
Necrotising fasciitis	4%
Scrofuloderma (cutaneous tuberculosis)	6%
Erysipelas	6%

The description of this gentleman's rash is a classic picture of erythema nodosum. Together with bilateral hilar lymphadenopathy, this makes sarcoid the most plausible diagnosis.

A 67-year-old man with a history of Parkinson's disease presents due to the development of an itchy, red rash on his neck, behind his ears and around the nasolabial folds. He had a similar flare up last winter but did not seek medical attention. What is the most likely diagnosis?

- ☐ Levodopa associated dermatitis
- ☐ Seborrhoeic dermatitis
- ☐ Flexural psoriasis
- ☐ Acne rosacea
- ☐ Fixed drug reaction to ropinirole

Levodopa associated dermatitis

11%

Seborrhoeic dermatitis

59%

Flexural psoriasis

10%

Acne rosacea

12%

Fixed drug reaction to ropinirole

8%

Parkinson's disease is associated with seborrhoeic dermatitis

Important for me

Less important

Seborrhoeic dermatitis is more common in patients with Parkinson's disease

A 30-year-old man presents with painful, purple coloured lesions on his shins. Some of these lesions have started to heal and no evidence of scarring is seen. These have been present for the past 2 weeks. There is no past medical history of note and he takes no regular medications. What is the most useful next investigation?

- ☐ Liver function tests
- ☐ Anti-nuclear antibody
- ☐ ECG
- ☐ HIV test
- ☐ Chest x-ray

Liver function tests

6%

Anti-nuclear antibody

17%

ECG

2%

HIV test

15%

Chest x-ray

60%

The likely diagnosis here is erythema nodosum (EN). All these tests may have a place but a chest x-ray is important as it helps exclude sarcoidosis and tuberculosis, two important cause of EN

A 60-year-old man is admitted to hospital with acute pneumonia. He has a past medical history of chronic obstructive pulmonary disease, alcohol excess and hypertension, and has been homeless for the last 12 years. On the post-take ward round, you notice that he has a brown-red discolouration of his face, neck, forearms and lower legs, with scaling and cracking of the skin. He complains that he is struggling to eat and drink and has persistent vomiting and diarrhoea. He seems a little disorientated. Which vitamin deficiency is most likely to be causing these symptoms?

- ☐ B2 (riboflavin)
- ☐ B3 (niacin)
- ☐ B6 (pyridoxine)
- ☐ B1 (thiamine)
- ☐ B12 (cyanocobalamin)

B2 (riboflavin)

6%

B3 (niacin)

69%

B6 (pyridoxine)

6%

B1 (thiamine)

13%

B12 (cyanocobalamin)

5%

Deficiency of niacin (B3) causes pellagra

Important for me Less important

The correct answer is B3- niacin. The patient has some of the symptoms of pellagra, which is classically characterised by the triad of dermatitis, diarrhoea and dementia. The 'dementia' more commonly presents subtly with low mood, irritability, apathy and anxiety, progressing to delusions, psychosis, drowsiness and coma.

DermNet NZ:

<https://www.dermnetnz.org/topics/pellagra/>

Dr Assem

A 14-year-old male is reviewed due to a patch of scaling and hair loss on the right side of his head. A skin scraping is sent which confirms a diagnosis of tinea capitis. Which organism is most likely to be responsible?

- ☐ Trichophyton tonsurans
- ☐ Microsporum distortum
- ☐ Trichophyton verrucosum
- ☐ Microsporum audouinii
- ☐ Microsporum canis

Trichophyton tonsurans

43%

Microsporum distortum

5%

Trichophyton verrucosum

27%

Microsporum audouinii

5%

Microsporum canis

19%

You review a 24-year-old man who has recently presented with large psoriatic plaques on his elbows and knees. He has no history of skin problems although his mother has psoriasis. You recommend that he uses an emollient to help control the scaling. What is the most appropriate further prescription to use as a first-line treatment on his plaques?

- ☐ Topical steroid
- ☐ Topical steroid + topical calcipotriol
- ☐ Topical coal tar
- ☐ Topical calcipotriol
- ☐ Topical dithranol

Topical steroid	25%
Topical steroid + topical calcipotriol	42%
Topical coal tar	11%
Topical calcipotriol	15%
Topical dithranol	7%

NICE recommend a potent corticosteroid applied once daily plus vitamin D analogue applied once daily (applied separately, one in the morning and the other in the evening) for up to 4 weeks as initial treatment.

Which one of the following statements regarding allergy testing is **incorrect**?

- ☐ Both irritants and allergens may be tested for using skin patch testing
- ☐ The radioallergosorbent test determines the level of IgE to a specific allergen
- ☐ Skin prick testing is easy to perform and inexpensive
- ☐ Skin prick testing should be read after 48 hours
- ☐ Skin prick testing normally includes a histamine control

Both irritants and allergens may be tested for using skin patch testing 19%

The radioallergosorbent test determines the level of IgE to a specific allergen 8%

Skin prick testing is easy to perform and inexpensive 10%

Skin prick testing should be read after 48 hours 49%

Skin prick testing normally includes a histamine control 14%

Skin prick testing can be read after 15-20 minutes. Skin patch testing is read after 48 hours

A 34-year-old man presents for the removal of a mole. Where on the body are keloid scars most likely to form?

☐ Sternum

☐ Lower back

☐ Abdomen

☐ Flexor surfaces of limbs

☐ Scalp

Sternum

72%

Lower back

5%

Abdomen

6%

Flexor surfaces of limbs

11%

Scalp

6%

Keloid scars are most common on the sternum

Important for me

Less important

A man presents with an area of dermatitis on his left wrist. He thinks he may be allergic to nickel. Which one of the following is the best test to investigate this possibility?

- ☐ Skin patch test
- ☐ Radioallergosorbent test (RAST)
- ☐ Nickel IgG levels
- ☐ Skin prick test
- ☐ Nickel IgM levels

Skin patch test

61%

Radioallergosorbent test (RAST)

11%

Nickel IgG levels

6%

Skin prick test

15%

Nickel IgM levels

6%

An 85-year-old lady presents to dermatology clinic complaining of itchy white plaques affecting her vulva. There is no history of vaginal discharge or bleeding. A similar plaque is also seen on her inner thigh. What is the likely diagnosis?

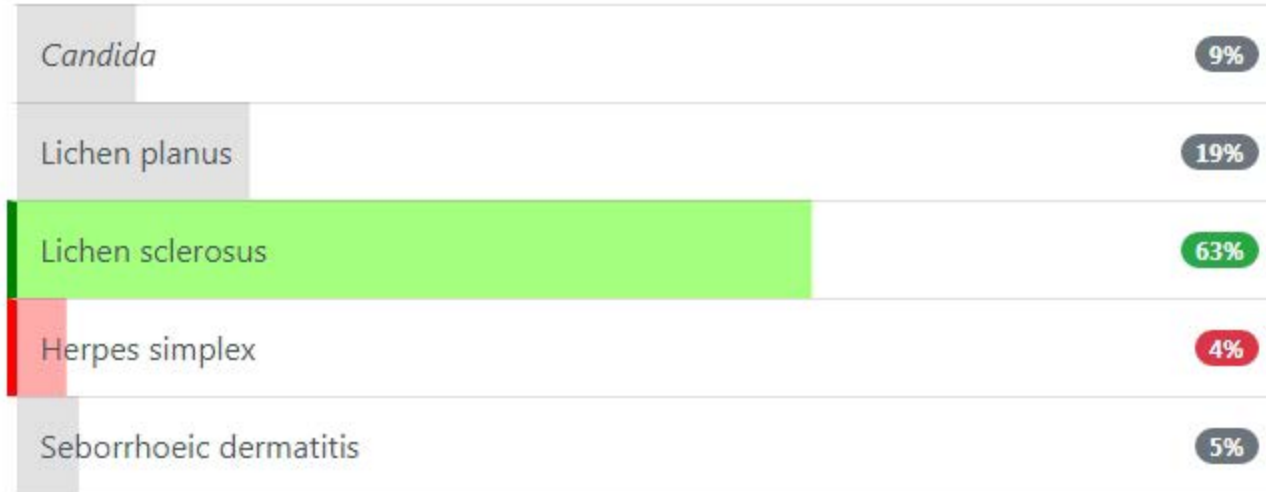
☐ *Candida*

☐ Lichen planus

☐ Lichen sclerosus

☐ Herpes simplex

☐ Seborrhoeic dermatitis



Lichen

- **p**lanus: **p**urple, **p**ruritic, **p**apular, **p**olygonal rash on flexor surfaces. Wickham's striae over surface. Oral involvement common
- sclerosus: itchy white spots typically seen on the vulva of elderly women

Important for me Less important

The correct answer is lichen sclerosus. *Candida* may cause pruritus and white plaques but lesions would not also be seen on her inner thigh

A 20-year-old man presents with acute gingivitis associated with oral ulceration. A diagnosis of primary herpes simplex infection is suspected.

Which one of the following types of rash is he most likely to go on to develop?

- ☐ Erythema ab igne
- ☐ Erythema nodosum
- ☐ Erythema chronicum migrans
- ☐ Erythema marginatum
- ☐ Erythema multiforme

Erythema ab igne

10%

Erythema nodosum

8%

Erythema chronicum migrans

9%

Erythema marginatum

18%

Erythema multiforme

56%

A 62-year-old male is referred to dermatology with a lesion over his shin. On examination shiny, painless areas of yellow skin over the shin are found with abundant telangiectasia. What is the most likely diagnosis?

- ☐ Pretibial myxoedema
- ☐ Necrobiosis lipoidica diabetorum
- ☐ Erythema nodosum
- ☐ Pyoderma gangrenosum
- ☐ Syphilis

Pretibial myxoedema

15%

Necrobiosis lipoidica diabetorum

68%

Erythema nodosum

7%

Pyoderma gangrenosum

6%

Syphilis

3%

A woman presents with painful erythematous lesions on her shins. Which one of the following is least associated with this presentation?

- ☐ Pregnancy
- ☐ Behcet's syndrome
- ☐ Streptococcal infection
- ☐ Penicillin
- ☐ Amyloidosis

A woman presents with painful erythematous lesions on her shins. Which one of the following is least associated with this presentation?

Pregnancy

13%

Behcet's syndrome

17%

Streptococcal infection

9%

Penicillin

13%

Amyloidosis

48%

Dr. S. S. S.

Which one of the following statements regarding scabies is false?

- ☐ All members of the household should be treated
- ☐ Typically affects the fingers, interdigital webs and flexor aspects of the wrist in adults
- ☐ Scabies causes a delayed type IV hypersensitivity reaction
- ☐ Patients who complain of pruritus 4 weeks following treatment should be retreated
- ☐ Malathion is suitable for the eradication of scabies

All members of the household should be treated

6%

Typically affects the fingers, interdigital webs and flexor aspects of the wrist in adults

5%

Scabies causes a delayed type IV hypersensitivity reaction

15%

Patients who complain of pruritus 4 weeks following treatment should be retreated

57%

Malathion is suitable for the eradication of scabies

18%

It is normal for pruritus to persist for up to 4-6 weeks post eradication

Dr Assem

Which of the following skin disorders is least associated with tuberculosis?

☐ Scrofuloderma

☐ Erythema nodosum

☐ Lupus vulgaris

☐ Verrucosa cutis

☐ Lupus pernio



Lupus pernio is sometimes seen in sarcoidosis but is not associated with tuberculosis

A 23-year-old man presents as he is concerned over recent hair loss. Examination reveals a discrete area of hair loss on the left temporal region with no obvious abnormality of the underlying scalp. What is the most likely diagnosis?

- ☐ Telogen effluvium
- ☐ Alopecia areata
- ☐ Tinea capitis
- ☐ Male-pattern baldness
- ☐ Discoid lupus erythematosus

Telogen effluvium

9%

Alopecia areata

63%

Tinea capitis

10%

Male-pattern baldness

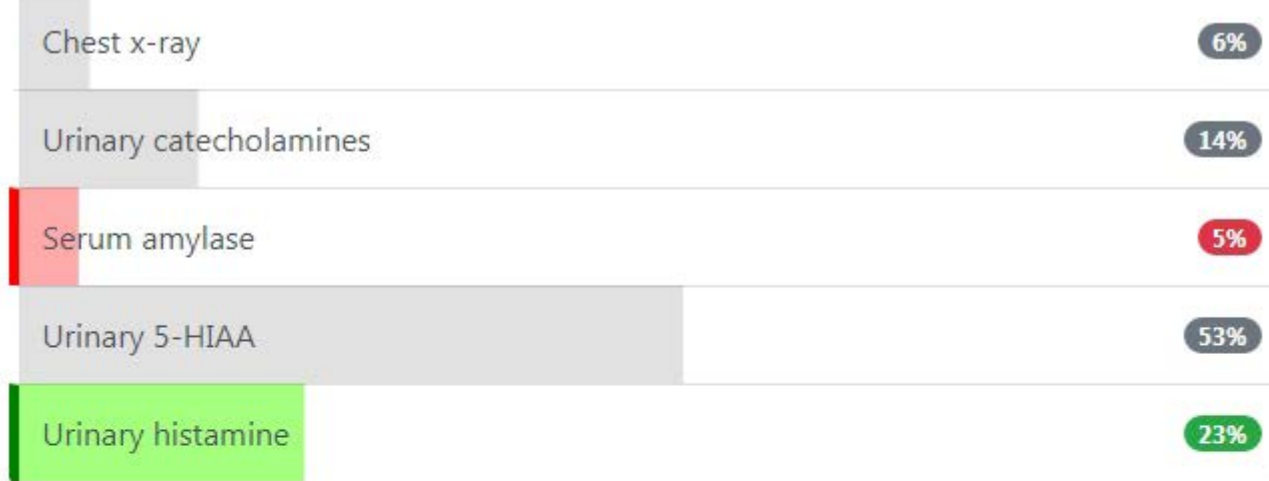
13%

Discoid lupus erythematosus

4%

A 17-year-old man presents with a 2 week history of abdominal pain, diarrhoea and repeated episodes of flushing. Examination reveals urticarial skin lesions on the trunk. What test is most likely to reveal the diagnosis?

- ☐ Chest x-ray
- ☐ Urinary catecholamines
- ☐ Serum amylase
- ☐ Urinary 5-HIAA
- ☐ Urinary histamine



Urinary histamine is used to diagnose systemic mastocytosis

Important for me [Less important](#)

Given the history of diarrhoea and flushing a diagnosis of carcinoid syndrome should be considered, which would be investigated with urinary 5-HIAA levels. This would not however explain the urticarial skin lesions. In a young person a diagnosis of systemic mastocytosis should be considered. Another factor against carcinoid syndrome is the age of the patient - the average age of a patient with a carcinoid tumour is 61 years

A 30-year-old female in her third trimester of pregnancy mentions during an antenatal appointment that she has noticed an itchy rash around her umbilicus. This is her second pregnancy and she had no similar problems in her first pregnancy. Examination reveals blistering lesions in the peri-umbilical region and on her arms. What is the likely diagnosis?

- ☐ Seborrhoeic dermatitis
- ☐ Pompholyx
- ☐ Polymorphic eruption of pregnancy
- ☐ Lichen planus
- ☐ Pemphigoid gestationis

Seborrhoeic dermatitis

5%

Pompholyx

9%

Polymorphic eruption of pregnancy

29%

Lichen planus

5%

Pemphigoid gestationis

52%

Polymorphic eruption of pregnancy is not associated with blistering

Important for me Less important

Pemphigoid gestationis is the correct answer. Polymorphic eruption of pregnancy is not associated with blistering

A 17-year-old male is reviewed six weeks after starting an oral antibiotic for acne vulgaris. He stopped taking the drug two weeks ago due to perceived alteration in his skin colour, and denies been exposed to strong sunlight for the past six months. On examination he has generalised increased skin pigmentation, including around the buttocks. Which one of the following antibiotics was he likely to be taking?

- ☐ Doxycycline
- ☐ Oxytetracycline
- ☐ Tetracycline
- ☐ Erythromycin
- ☐ Minocycline

Doxycycline

13%

Oxytetracycline

16%

Tetracycline

20%

Erythromycin

7%

Minocycline

44%

Minocycline can cause irreversible skin pigmentation and is now considered a second line drug in acne. Photosensitivity secondary to tetracycline/doxycycline is less likely given the generalised distribution of the pigmentation and the failure to improve following drug withdrawal

A 58-year-old woman presents with a persistent erythematous rash on her cheeks and a 'red nose'. She describes occasional episodes of facial flushing. On examination erythematous skin is noted on the nose and cheeks associated with occasional telangiectasia. What is the most appropriate management?

☐ Topical metronidazole

☐ Topical isotretinoin

☐ Benzyl peroxide

☐ Daktacort

☐ Topical hydrocortisone

Topical metronidazole

63%

Topical isotretinoin

9%

Benzyl peroxide

8%

Daktacort

3%

Topical hydrocortisone

17%

Acne rosacea treatment:

- mild/moderate: topical metronidazole
- severe/resistant: oral tetracycline

Important for me Less important

Given that this woman has mild symptoms, topical metronidazole should be used first line

A 34-year-old man presents to dermatology clinic with an itchy rash on his palms. He has also noticed the rash around the site of a recent scar on his forearm. Examination reveals papules with a white-lace pattern on the surface. Some isolated white streaks are also noted on the mucous membranes of the mouth. What is the diagnosis?

- ☐ Lichen planus
- ☐ Scabies
- ☐ Lichen sclerosus
- ☐ Morphea
- ☐ Pityriasis rosea

Lichen planus

64%

Scabies

5%

Lichen sclerosus

18%

Morphea

7%

Pityriasis rosea

6%

Lichen

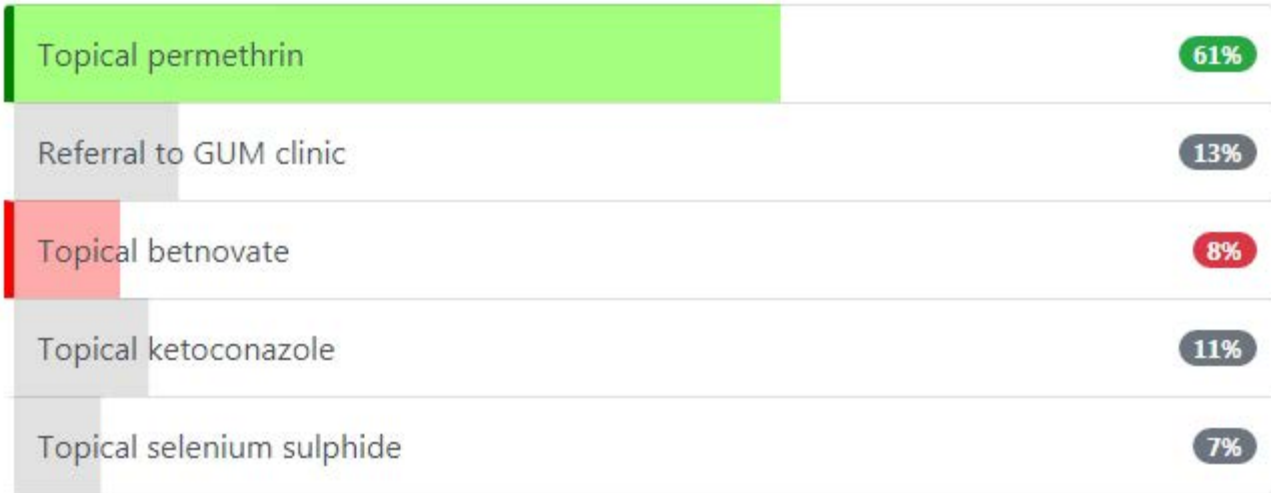
- **p**lanus: **p**urple, **p**ruritic, **p**apular, **p**olygonal rash on flexor surfaces. Wickham's striae over surface. Oral involvement common
- sclerosus: itchy white spots typically seen on the vulva of elderly women

Important for me Less important

This is a typical history of lichen planus.

A 78-year-old nursing home resident is reviewed due to the development of an intensely itchy rash. On examination red linear lesions are seen on the wrists and elbows, and red papules are present on the penis. What is the most appropriate management?

- ☐ Topical permethrin
- ☐ Referral to GUM clinic
- ☐ Topical betnovate
- ☐ Topical ketoconazole
- ☐ Topical selenium sulphide



Lichen planus may give a similar picture but the intense itching is more characteristic of scabies. It is also less common for lichen planus to present in the elderly - it typically affects patients aged 30-60 years.

A 40-year-old man complains of widespread pruritus for the past two weeks. The itching is particularly bad at night. He has no history of note and works in the local car factory. On examination he has noted to have a number of linear erythematous lesions in between his fingers. What is the most likely diagnosis?

- ☐ Polyurethane dermatitis
- ☐ Fibreglass exposure
- ☐ Cimex lectularius infestation (Bed-bugs)
- ☐ Scabies
- ☐ Langerhans cell histiocytosis

A 40-year-old man complains of widespread pruritus for the past two weeks. The itching is particularly bad at night. He has no history of note and works in the local car factory. On examination he has noted to have a number of linear erythematous lesions in between his fingers. What is the most likely diagnosis?

Polyurethane dermatitis

7%

Fibreglass exposure

7%

Cimex lectularius infestation (Bed-bugs)

5%

Scabies

78%

Langerhans cell histiocytosis

3%

A 31-year-old woman develops with painful, purple lesions on her shins. Which one of the following medications is most likely to be responsible?

- ☐ Montelukast
- ☐ Lansoprazole
- ☐ Combined oral contraceptive pill
- ☐ Sodium valproate
- ☐ Carbimazole

Montelukast

5%

Lansoprazole

3%

Combined oral contraceptive pill

64%

Sodium valproate

12%

Carbimazole

15%

A 24-year-old woman presents due to a rash on her neck and forehead. She returned from a holiday in Cyprus 1 week ago and had her hair dyed 2 days ago. On examination there is a weepy, vesicular rash around her hairline although the scalp itself is not badly affected. What is the most likely diagnosis?

- ☐ Cutaneous leishmaniasis
- ☐ Irritant contact dermatitis
- ☐ Allergic contact dermatitis
- ☐ Syphilis
- ☐ Photocontact dermatitis

Cutaneous leishmaniasis

7%

Irritant contact dermatitis

41%

Allergic contact dermatitis

33%

Syphilis

3%

Photocontact dermatitis

16%

A 29-year-old man presents due to the development of 'hard skin' on his scalp. On examination he has a 9cm circular, white, hyperkeratotic lesion on the crown of his head. He has no past history of any skin or scalp disorder. Skin scrapings are reported as follows:

No fungal elements seen

What is the most likely diagnosis?

- ☐ Psoriasis
- ☐ Dissecting cellulitis
- ☐ Kerion
- ☐ Systemic lupus erythematosus
- ☐ Seborrhoeic dermatitis

Psoriasis	35%
Dissecting cellulitis	5%
Kerion	30%
Systemic lupus erythematosus	7%
Seborrhoeic dermatitis	23%

As the skin scraping is negative for fungi the most likely diagnosis is psoriasis. Scalp psoriasis may occur in isolation in patients with no history of psoriasis elsewhere. Please see the link for more information.

The white appearance of the lesion is secondary to the 'silver scale' covering the psoriatic plaque.

A 21-year-old woman who is 16 weeks pregnant present with worsening acne which she is finding distressing. She is currently using topical benzyl peroxide with limited effect. On examination there is widespread non-inflammatory lesions and pustules on her face. What is the most appropriate next management step?

- ☐ Oral trimethoprim
- ☐ Oral lymecycline
- ☐ Oral erythromycin
- ☐ Topical retinoid
- ☐ Oral doxycycline

Oral trimethoprim

8%

Oral lymecycline

12%

Oral erythromycin

41%

Topical retinoid

22%

Oral doxycycline

18%

Acne vulgaris in pregnancy - use oral erythromycin if treatment needed

Important for me

Less important

Oral erythromycin may be used for acne in pregnancy. The other drugs are contraindicated

Dr Assem

A 81-year-old man is investigated after he develops a number of itchy blisters on his trunk. A skin biopsy suggests a diagnosis bullous pemphigoid. This is most likely to be caused by antibodies directed against:

- ☐ Adherens
- ☐ Desmoglein-3
- ☐ Hemidesmosomal BP antigens
- ☐ Occludin-2
- ☐ Desmoglein-1

Adherens

7%

Desmoglein-3

22%

Hemidesmosomal BP antigens

51%

Occludin-2

5%

Desmoglein-1

15%

A 26-year-old lady presents to you distressed due to the presence of a rash over her thorax and abdomen for the last three weeks. On examination, you note numerous teardrop lesions on her body.

She has no known past medical history and denies exposure to any new irritants. She states that she is going to be married in 2 weeks and wants to know if there is anything that can be done to hasten the disappearance of her rash.

Which therapy could this lady be commenced on?

☐ Photochemotherapy (PUVA) A

☐ Oral prednisolone

☐ Dermovate

☐ Ultraviolet B phototherapy

☐ Methotrexate

Photochemotherapy (PUVA) A	21%
Oral prednisolone	19%
Dermovate	19%
Ultraviolet B phototherapy	37%
Methotrexate	5%

This patient has a classic description of guttate psoriasis. Whilst this will usually self-resolve, ultraviolet B phototherapy has been known to accelerate resolution. The other treatments have no role in the acute management of guttate psoriasis.

A 33-year-old lady presents complaining of facial discolouration. She is 26 weeks pregnant. So far it has been an uncomplicated pregnancy. She has a background of rheumatoid arthritis but has been off treatment for 2 years.

On examination she has a large, flat, symmetrical, brown-pigmented patch across her cheeks, forehead, nose and upper lip.

What is the most likely diagnosis?

- ☐ Systemic Lupus Erythematosus (SLE)
- ☐ Melasma
- ☐ Polymorphic eruption of pregnancy
- ☐ Rosacea
- ☐ Vitiligo

Systemic Lupus Erythematosus (SLE)

12%

Melasma

60%

Polymorphic eruption of pregnancy

15%

Rosacea

8%

Vitiligo

5%

Melasma is a benign but relatively common skin condition which can appear in pregnancy. In this situation it may resolve a few months after delivery.

A 17-year-old female originally from Nigeria presents due to a swelling around her earlobe. She had her ears pierced around three months ago and has noticed the gradual development of an erythematous swelling since. On examination a keloid scar is seen. What is the most appropriate management?

- ☐ Intralesional diclofenac
- ☐ Advise no treatment is available
- ☐ Intralesional triamcinolone
- ☐ Advise will spontaneously regress within 4-6 months
- ☐ Intralesional sclerotherapy

Intralesional diclofenac

6%

Advise no treatment is available

13%

Intralesional triamcinolone

59%

Advise will spontaneously regress within 4-6 months

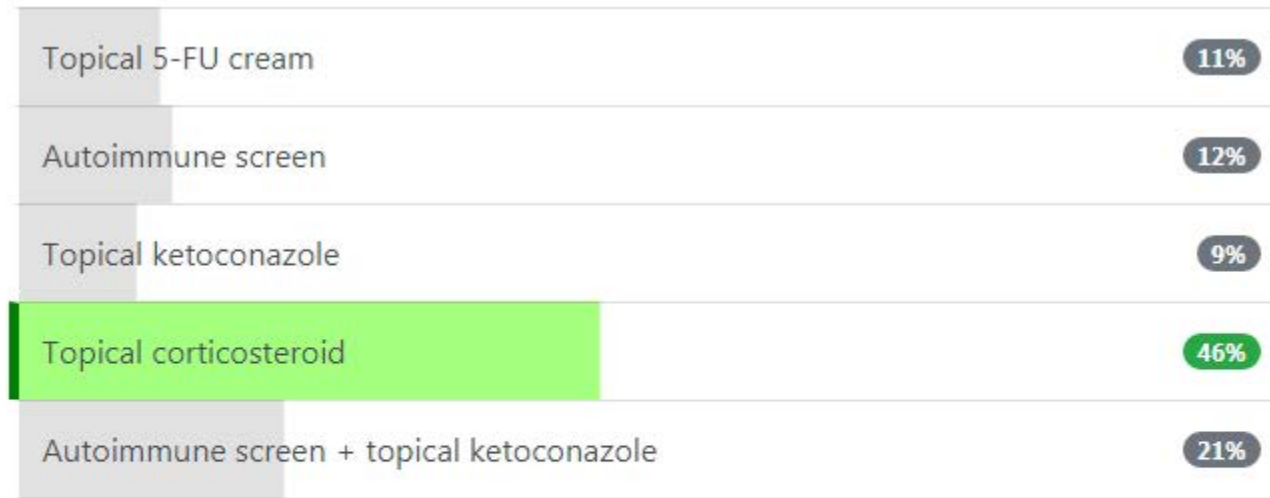
8%

Intralesional sclerotherapy

14%

A 33-year-old woman is reviewed in the dermatology clinic with patchy, well demarcated hair loss on the scalp. This is affecting around 20% of her total scalp, and causing significant psychological distress. A diagnosis of alopecia areata is suspected. Which one of the following is an appropriate management plan?

- ☐ Topical 5-FU cream
- ☐ Autoimmune screen
- ☐ Topical ketoconazole
- ☐ Topical corticosteroid
- ☐ Autoimmune screen + topical ketoconazole



Watchful waiting for spontaneous remission is another option. Neither the British Association of Dermatologists or Clinical Knowledge Summaries recommend screening for autoimmune disease

Each one of the following is associated with hypertrichosis, except:

- ☐ Anorexia nervosa
- ☐ Porphyria cutanea tarda
- ☐ Psoriasis
- ☐ Minoxidil
- ☐ Ciclosporin

Anorexia nervosa

19%

Porphyria cutanea tarda

11%

Psoriasis

51%

Minoxidil

9%

Ciclosporin

10%

Dr. Arsem

A 62-year-old with a history of acne rosacea presents for advice regarding treatment. Which one of the following interventions has the least role in management?

- ☐ Camouflage creams
- ☐ Topical metronidazole
- ☐ Low-dose topical corticosteroids
- ☐ Laser therapy
- ☐ Use of high-factor sun block

Camouflage creams

14%

Topical metronidazole

15%

Low-dose topical corticosteroids

41%

Laser therapy

20%

Use of high-factor sun block

10%

A 9-year-old child with a history of atopic eczema presents with a sudden worsening of her skin. Her eczema is usually well controlled with emollients but her parents are concerned as the facial eczema has got significantly worse overnight. She now has painful clustered blisters on both cheeks, around her mouth on her neck. Her temperature is 37.9°C. What is the most appropriate management?

- ☐ Advise paracetamol + emollients and reassure
- ☐ Intravenous aciclovir
- ☐ Potent topical steroid
- ☐ Intravenous flucloxacillin
- ☐ Oral fluconazole

Advise paracetamol + emollients and reassure

10%

Intravenous aciclovir

42%

Potent topical steroid

14%

Intravenous flucloxacillin

28%

Oral fluconazole

5%

Eczema herpeticum is a serious condition that requires IV antivirals

Important for me Less important

Which one of the following statements regarding vitiligo is true?

- ☐ It is seen in around 0.1% of patients
- ☐ The average age of onset is 40-50 years
- ☐ Skin trauma may precipitate new skin lesions
- ☐ It is rare in Caucasian people
- ☐ The torso tends to be affected first

It is seen in around 0.1% of patients

8%

The average age of onset is 40-50 years

8%

Skin trauma may precipitate new skin lesions

62%

It is rare in Caucasian people

11%

The torso tends to be affected first

11%

This is known as the Koebner phenomenon

Dr. Assem

Which one of the following statements regarding acne vulgaris is **incorrect**?

- ☐ Follicular epidermal hyperproliferation results in obstruction of the pilosebaceous follicle
- ☐ Acne vulgaris affects at least 80% of teenagers
- ☐ Propionibacterium acnes is an anaerobic bacterium
- ☐ Typical lesions include comedones and pustules
- ☐ Beyond the age of 25 years acne vulgaris is more common in males

Follicular epidermal hyperproliferation results in obstruction of the pilosebaceous follicle

7%

Acne vulgaris affects at least 80% of teenagers

25%

Propionibacterium acnes is an anaerobic bacterium

11%

Typical lesions include comedones and pustules

6%

Beyond the age of 25 years acne vulgaris is more common in males

51%

Acne is actually more common in females after the age of 25 years

Dr Assem

A 50-year-old man with a history of ulcerative colitis comes for review. Six years ago he had an ileostomy formed which has been functioning well until now. Unfortunately he is currently suffering significant pain around the stoma site. On examination a deep erythematous ulcer is noted with a ragged edge. The surrounding skin is erythematous and swollen. What is the most likely diagnosis?

- ☐ Munchausen's syndrome
- ☐ Irritant contact dermatitis
- ☐ Pyoderma gangrenosum
- ☐ Dermatitis artefacta
- ☐ Stomal granuloma

Munchausen's syndrome	4%
Irritant contact dermatitis	19%
Pyoderma gangrenosum	44%
Dermatitis artefacta	6%
Stomal granuloma	27%

Pyoderma gangrenosum is associated with inflammatory bowel disease and may be seen around the stoma site. Treatment is usually with immunosuppressants as surgery may worsen the problem

A differential diagnosis would be malignancy and hence lesions should be referred for specialist opinion to evaluate the need for a biopsy. Irritant contact dermatitis is common but would not be expected to cause such a deep ulcer.

Each one of the following is associated with yellow nail syndrome except:

- ☐ Chronic sinus infections
- ☐ Bronchiectasis
- ☐ Azoospermia
- ☐ Congenital lymphoedema
- ☐ Pleural effusions

Chronic sinus infections

10%

Bronchiectasis

8%

Azoospermia

46%

Congenital lymphoedema

18%

Pleural effusions

17%

A 34-year-old man comes for review. Over the past two weeks he has developed a number of painful, erythematous lesions on his shins. He has no dermatological history of note and is usually fit and well. On examination the lesions are consistent with erythema nodosum. You arrange some baseline investigations. He asks what is likely to happen. What is the most appropriate response?

- ☐ Heal without scarring if steroids are given within 2 weeks
- ☐ Heal without scarring within 6-12 months
- ☐ Heal without scarring within 1-2 months
- ☐ Heal with scarring within 1-2 months
- ☐ Heal with scarring within 6-12 months

Heal without scarring if steroids are given within 2 weeks

12%

Heal without scarring within 6-12 months

26%

Heal without scarring within 1-2 months

47%

Heal with scarring within 1-2 months

8%

Heal with scarring within 6-12 months

7%

Which one of the following conditions is least associated with pruritus?

- ☐ Pemphigus vulgaris
- ☐ Iron-deficiency anaemia
- ☐ Polycythaemia
- ☐ Chronic renal failure
- ☐ Scabies

Pemphigus vulgaris

42%

Iron-deficiency anaemia

42%

Polycythaemia

8%

Chronic renal failure

5%

Scabies

3%

Pemphigus vulgaris is an autoimmune bullous disease of the skin. It is not commonly associated with pruritus

Which of the following conditions is least likely to exhibit the Koebner phenomenon?

☐ Vitiligo

☐ Molluscum contagiosum

☐ Lichen planus

☐ Psoriasis

☐ Lupus vulgaris

Vitiligo

13%

Molluscum contagiosum

31%

Lichen planus

9%

Psoriasis

9%

Lupus vulgaris

37%

Lupus vulgaris is not associated with the Koebner phenomenon

Dr Assef

Which one of the following is least recognised as a cause of erythroderma in the UK?

- ☐ Lymphoma
- ☐ Drug eruption
- ☐ Lichen planus
- ☐ Psoriasis
- ☐ Eczema

Lymphoma

24%

Drug eruption

8%

Lichen planus

45%

Psoriasis

11%

Eczema

11%

A 45-year-old man develops toxic epidermal necrolysis following a change in his epilepsy medication. He is systemically unwell and is admitted to ITU for supportive care. What is the most appropriate treatment?

- ☐ Intravenous immunoglobulin
- ☐ Cyclophosphamide
- ☐ Supportive care only
- ☐ Pulsed methylprednisolone
- ☐ Plasmapheresis

Intravenous immunoglobulin

45%

Cyclophosphamide

4%

Supportive care only

24%

Pulsed methylprednisolone

13%

Plasmapheresis

14%

A 74-year-old lady with a history of hypothyroidism presents in January with a rash down the right side of her body. On examination an erythematous rash with patches of hyperpigmentation and telangiectasia is found. What is the likely diagnosis?

- ☐ Erythema marginatum
- ☐ Herpes zoster
- ☐ Pretibial myxoedema
- ☐ Erythema ab igne
- ☐ Xanthomata

Erythema marginatum

22%

Herpes zoster

4%

Pretibial myxoedema

12%

Erythema ab igne

57%

Xanthomata

4%

This is a classic presentation of erythema ab igne. Despite the name, pretibial myxoedema is associated with hyperthyroidism rather than hypothyroidism.

Hypothyroidism can make patients feel cold and hence more likely to sit next a heater / fire.

Dr Arsem

A 78-year-old man asks you to look at a lesion on the right side of nose which has been getting slowly bigger over the past 2-3 months. On examination you observe a round, raised, flesh coloured lesion which is 3mm in diameter and has a central depression. The edges of the lesion appear rolled and contain some telangiectasia.

What is the single most likely diagnosis?

- ☐ Molluscum contagiosum
- ☐ Actinic keratosis
- ☐ Squamous cell carcinoma
- ☐ Malignant melanoma
- ☐ Basal cell carcinoma

Molluscum contagiosum

11%

Actinic keratosis

8%

Squamous cell carcinoma

12%

Malignant melanoma

5%

Basal cell carcinoma

64%

This is a classic description of a basal cell carcinoma.

A 54-year-old man presents with a brown velvety rash on the back of his neck around his axilla. A clinical diagnosis of acanthosis nigricans is made. Which one of the following conditions is most associated with this kind of rash?

- ☐ Hypothyroidism
- ☐ Psoriasis
- ☐ Tuberculosis
- ☐ Ulcerative colitis
- ☐ Acute pancreatitis

Hypothyroidism

59%

Psoriasis

3%

Tuberculosis

8%

Ulcerative colitis

19%

Acute pancreatitis

11%

A 54-year-old man presents with a two month history of a rapidly growing lesion on his right forearm. The lesion initially appeared as a red papule but in the last two weeks has become a crater filled centrally with yellow/brown material. On examination the man has skin type II, the lesion is 4 mm in diameter and is morphologically as described above. What is the most likely diagnosis?

- ☐ Seborrhoeic keratosis
- ☐ Keratoacanthoma
- ☐ Pyoderma gangrenosum
- ☐ Basal cell carcinoma
- ☐ Malignant melanoma

Seborrhoeic keratosis

6%

Keratoacanthoma

60%

Pyoderma gangrenosum

15%

Basal cell carcinoma

13%

Malignant melanoma

6%

A 64-year-old female is referred to dermatology due to a non-healing skin ulcer on her lower leg. This has been present for around 6 weeks and the appearance didn't improve following a course of oral flucloxacillin. What is the most important investigation to perform first?

- ☐ MRI
- ☐ Rheumatoid factor titres
- ☐ Ankle-brachial pressure index
- ☐ Swab of ulcer for culture and sensitivity
- ☐ X-ray

MRI	4%
Rheumatoid factor titres	3%
Ankle-brachial pressure index	79%
Swab of ulcer for culture and sensitivity	10%
X-ray	5%

An ankle-brachial pressure index measurement would help exclude arterial insufficiency as a contributing factor. If this was abnormal then a referral to the vascular surgeons should be considered.

If the ulcer fails to heal with active management (e.g. Compression bandaging) then referral for consideration of biopsy to exclude a malignancy should be made.

Ongoing infection is not a common cause of non-healing leg ulcers.

A 52-year-old African-American woman presents to the dermatology department. She has noticed a patch of pigmented skin on her toe, which has been slowly enlarging over the past five months. On examination, she has pigmentation of the nail bed of her great toe, affecting the adjacent cuticle and proximal nail fold. Which subtype of melanoma would you expect to present in this manner?

- ☐ Superficial spreading melanoma
- ☐ Acral lentiginous melanoma
- ☐ Lentigo maligna melanoma
- ☐ Nodular melanoma
- ☐ Amelanotic melanoma

Superficial spreading melanoma

14%

Acral lentiginous melanoma

60%

Lentigo maligna melanoma

17%

Nodular melanoma

5%

Amelanotic melanoma

4%

Acral lentiginous melanoma: Pigmentation of nail bed affecting proximal nail fold suggests melanoma (Hutchinson's sign)

Important for me Less important

Acral lentiginous melanoma is the rarest form of melanoma overall, but the commonest form of melanoma in people with darker skin. Hence it is important to be able to recognise.

Acral lentiginous melanoma mostly affects people over the age of 40 and is equally common in males and females. It is not related to sun exposure. It typically presents as an enlarging discoloured skin patch on the palms, fingers, soles or toes with the characteristics of other flat forms of melanoma. It can arise in the nail unit, appearing as general discolouration or irregular pigmented bands running longitudinally along the nail plate and is called subungual melanoma when it arises in the matrix.

This patient has subungual acral lentiginous melanoma with an important clinical clue of this called 'Hutchinson's nail sign'. This sign is characterised by extension of the nail bed, matrix and nail plate pigmentation to the adjacent cuticle and proximal or lateral nail folds.

The other forms of melanoma are less likely to present in this way and are described in more detail in the notes below

(DermNet NZ)

Dr Assem

A 22-year-old male is referred to dermatology clinic with a longstanding problem of bilateral excessive axillary sweating. He is otherwise well but the condition is affecting his confidence and limiting his social life. What is the most appropriate management?

- ☐ Non-sedating antihistamine
- ☐ Topical hydrocortisone 1%
- ☐ Perform thyroid function tests
- ☐ Topical aluminium chloride
- ☐ Trial of desmopressin

Non-sedating antihistamine

6%

Topical hydrocortisone 1%

5%

Perform thyroid function tests

13%

Topical aluminium chloride

69%

Trial of desmopressin

8%

Which one of the following features is least likely to be seen in a patient with pellagra?

☐ Diarrhoea

☐ Depression

☐ Dysphagia

☐ Dermatitis

☐ Dementia



Depression is quite a common early finding in patients with pellagra

Which one of the following side-effects is least recognised in patients taking isotretinoin?

☐ Hypertension

☐ Teratogenicity

☐ Nose bleeds

☐ Depression

☐ Raised triglycerides

Dr Assem

Hypertension

40%

Teratogenicity

7%

Nose bleeds

26%

Depression

14%

Raised triglycerides

14%

Isotretinoin adverse effects

- teratogenicity - females **MUST** be taking contraception
- low mood
- dry eyes and lips
- raised triglycerides
- hair thinning
- nose bleeds

Important for me Less important

Hypertension is not listed in the British National Formulary as a side-effect

A 3-year-old girl is taken to her doctor due to a rash on the right upper arm. On examination multiple raised lesions of about 2 mm in diameter are seen. On close inspection a central dimple is present in the majority of lesions. What is the likely diagnosis?

- ☐ Roseola infantum
- ☐ Molluscum contagiosum
- ☐ Kawasaki disease
- ☐ Viral warts
- ☐ Pityriasis rosea

Roseola infantum

10%

Molluscum contagiosum

76%

Kawasaki disease

3%

Viral warts

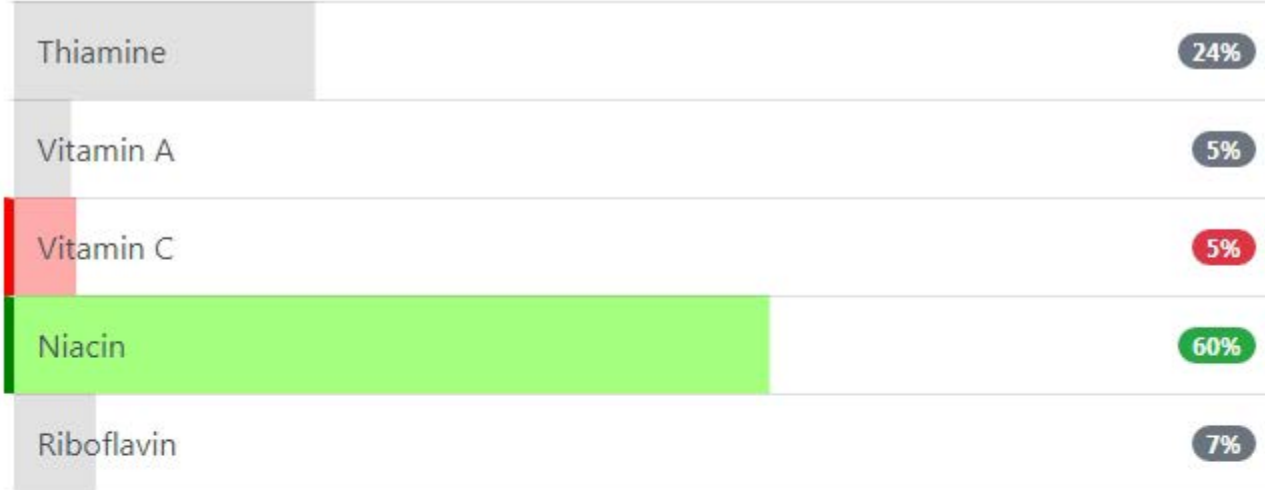
4%

Pityriasis rosea

6%

A 48-year-old presents with diarrhoea and confusion. He is known to be alcohol dependent, having previously had several admission with alcohol toxicity. He consumes 45 units of alcohol per week, and has had previous admissions for aspiration pneumonia. He denies head trauma. On examination he appears confused and anxious, and there is a rash around his neck which appears to be in sun exposed areas. It appears pigmented. A CT scan of the head is normal. What deficiency would most likely explain his presentation?

- ☐ Thiamine
- ☐ Vitamin A
- ☐ Vitamin C
- ☐ Niacin
- ☐ Riboflavin



The correct answer is niacin. Niacin deficiency, or pellagra, typically presents as the triple combination of dementia, diarrhoea and dermatitis. The dermatitis is a photosensitive pigmented dermatitis. The significant alcohol history makes niacin deficiency very likely. Thiamine deficiency causes beriberi and Wernicke-Korsakoff syndrome, neither which would explain his rash. Vitamin C deficiency causes scurvy which is associated with bleeding and gum ulceration.

Source:
Pzirandeh, Sassan, and David L. Burns. 'Overview of Water-soluble Vitamins.' UpToDate. N.p., 05 Jan. 2017

A 55-year-old man presents with multiple erythematous target lesions two days after starting a new medication. Which one of the following drugs is most likely to have been started?

- ☐ Levetiracetam
- ☐ Olanzapine
- ☐ Carbamazepine
- ☐ Fluoxetine
- ☐ Diazepam

Levetiracetam

8%

Olanzapine

8%

Carbamazepine

74%

Fluoxetine

7%

Diazepam

3%

This patient appears to have erythema multiforme which is a known complication of carbamazepine use

Dr Assem

A 26-year-old newly qualified nurse presents as she has developed a bilateral erythematous rash on both hands. She has recently emigrated from the Philippines and has no past medical history of note. A diagnosis of contact dermatitis is suspected. What is the most suitable to test to identify the underlying cause?

☐ Radioallergosorbent test (RAST)

☐ Latex IgM levels

☐ Skin prick test

☐ Urinary porphyrins

☐ Skin patch test



The skin patch test is useful in this situation as it may also identify irritants, not just allergens

A 34-year-old patient who is known to have psoriasis presents with erythematous skin in the groin and genital area. He also has erythematous skin in the axilla. In the past he has expressed a dislike of messy or cumbersome creams. What is the most appropriate treatment?

- ☐ Topical steroid
- ☐ Topical dithranol
- ☐ Topical clotrimazole
- ☐ Coal tar
- ☐ Topical calcipotriol



Flexural psoriasis - topical steroid

Important for me Less important

This patient has flexural psoriasis which responds well to topical steroids. Topical calcipotriol is usually irritant in flexures. Mild tar preparations are an option but may be messy and cumbersome.

A 34-year-old female is reviewed in the dermatology clinic with a skin rash under her new wrist watch. An allergy to nickel is suspected. What is the best investigation?

- ☐ Skin prick test
- ☐ Skin patch test
- ☐ Skin biopsy
- ☐ Serum IgE
- ☐ Serum nickel antibodies

Skin prick test

12%

Skin patch test

73%

Skin biopsy

3%

Serum IgE

6%

Serum nickel antibodies

5%

A 22-year-old male sex worker comes to the Emergency department with an erythematous skin rash. He tells you that it began on his scalp, and is now spreading to involve his face, neck, and the flexor surfaces of his arms and legs. He has no significant past medical history and takes no regular medication. Blood pressure, pulse and temperature are all normal. Respiratory and abdominal examination is unremarkable. There are extensive erythematous scaly plaques, the overlying skin is greasy and there are areas of yellow / brown crusted material.

Which of the following tests is most important in this situation?

- ☐ Autoimmune profile
- ☐ Herpes PCR
- ☐ HIV testing
- ☐ Skin scrapings for microscopy and culture
- ☐ Syphilis serology

Autoimmune profile	6%
Herpes PCR	8%
HIV testing	50%
Skin scrapings for microscopy and culture	22%
Syphilis serology	13%

HIV is associated with seborrhoeic dermatitis

Important for me Less important

This man's presentation is consistent with seborrhoeic dermatitis, and given his occupation as a male sex worker, there is a high risk this may be associated with HIV infection. p24 antigen testing may be useful in the early stages of HIV infection for screening, in the later stages of infection serology for anti-HIV antibodies is most useful.

The extensive plaques count against this being a fungal infection, which would usually be confined to one area, ruling out taking skin scrapings as being useful. Seborrhoeic dermatitis may be associated with autoimmune thyroid disease, although we're given no evidence to support a diagnosis of thyroid dysfunction here. Syphilis is unlikely given there is no history of primary syphilis infection, and herpes PCR is not useful in determining the underlying cause of seborrhoeic dermatitis.

A 50-year-old chronic alcoholic presents with a persistent skin rash on his hands, arms, neck and face. The rash is red-brown in colour, symmetrical and scaly. He also complains of a poor appetite, nausea and diarrhoea. Which vitamin deficiency is most likely to have caused his symptoms?

☐ Niacin

☐ Folic acid

☐ Thiamine

☐ Vitamin B6

☐ Zinc

Niacin

62%

Folic acid

4%

Thiamine

16%

Vitamin B6

7%

Zinc

11%

Niacin (B3) deficiency is characterised by dermatitis, diarrhoea and dementia, a condition known as pellagra

Important for me Less important

A 54-year-old woman who has had a hysterectomy presents for advice about hormone replacement therapy. Which one of the following would result from the use of a combined oestrogen-progestogen preparation compared to an oestrogen-only preparation?

- ☐ Decreased risk of venous thromboembolism
- ☐ Increased risk of a stroke
- ☐ Increased risk of breast cancer
- ☐ Increased risk of endometrial cancer
- ☐ Better control of symptoms

Decreased risk of venous thromboembolism

20%

Increased risk of a stroke

17%

Increased risk of breast cancer

31%

Increased risk of endometrial cancer

21%

Better control of symptoms

11%

HRT: adding a progestogen increases the risk of breast cancer

Important for me Less important

This is the rationale behind giving women who've had a hysterectomy oestrogen-only treatment. The BNF states that the stroke risk is the same regardless of whether the HRT preparation contains progesterone.

Which one of the following increases the risk of developing peripheral oedema in a patient taking pioglitazone?

- ☐ Concomitant use with gliclazide
- ☐ Serum sodium < 140 mmol/l
- ☐ Concomitant use with insulin
- ☐ Concomitant use with metformin
- ☐ Serum potassium < 4.0 mmol/l

Concomitant use with gliclazide

23%

Serum sodium < 140 mmol/l

26%

Concomitant use with insulin

34%

Concomitant use with metformin

11%

Serum potassium < 4.0 mmol/l

7%

A 54-year-old man has a routine medical for work. He is asymptomatic and clinical examination is unremarkable. Which of the following results establishes a diagnosis of impaired fasting glucose?

- ☐ Fasting glucose 7.1 mmol/L on one occasion
- ☐ Fasting glucose 6.8 mmol/L on two occasions
- ☐ Glycosuria ++
- ☐ 75g oral glucose tolerance test 2 hour value of 8.4 mmol/L
- ☐ HbA1c of 6.7%

Fasting glucose 7.1 mmol/L on one occasion

15%

Fasting glucose 6.8 mmol/L on two occasions

67%

Glycosuria ++

2%

75g oral glucose tolerance test 2 hour value of 8.4 mmol/L

8%

HbA1c of 6.7%

7%

A 75g oral glucose tolerance test 2 hour value of 8.4 mmol/L would imply impaired glucose tolerance rather than impaired fasting glucose

A 45-year-old man presents with bitemporal hemianopia and spade-like hands. What is the definite test to confirm the diagnosis?

- ☐ Early morning growth hormone
- ☐ Insulin tolerance test
- ☐ Oral glucose tolerance test with growth hormone measurements
- ☐ Random insulin-like growth factor 1 (IGF-1)
- ☐ Short ACTH test

Early morning growth hormone

10%

Insulin tolerance test

12%

Oral glucose tolerance test with growth hormone measurements

52%

Random insulin-like growth factor 1 (IGF-1)

17%

Short ACTH test

8%

The diagnostic test for acromegaly is an oral glucose tolerance with growth hormone measurements

Important for me Less important

Which one of the following is least associated with gynaecomastia?

☐ Klinefelter's syndrome

☐ Seminoma

☐ Liver disease

☐ Puberty

☐ Hypothyroidism

Klinefelter's syndrome

11%

Seminoma

23%

Liver disease

4%

Puberty

11%

Hypothyroidism

51%

Gynaecomastia is seen in up to a third of men with thyrotoxicosis, but is not a feature of hypothyroidism

A 73-year-old female present with urge incontinence having a significant impact on her quality of life. She has undergone supervised bladder training with no improvement in symptoms and is keen to trial medication. She has a past medical history of atrial fibrillation, well-controlled hypertension and recurrent urinary retention.

What would be the most appropriate first-line treatment?

- ☐ Mirabegron
- ☐ Oxybutynin
- ☐ Pelvic floor exercises
- ☐ Tolterodine
- ☐ Surgical repair

Mirabegron

39%

Oxybutynin

29%

Pelvic floor exercises

6%

Tolterodine

21%

Surgical repair

4%

Anticholinergics for urge incontinence are associated with confusion in elderly people - mirabegron is a preferable alternative

Important for me Less important

The key to this question is to recognise that antimuscarinics the usual treatment for urge incontinence are contraindicated in patients with a history of urinary retention. As such mirabegron is the correct answer.

Oxybutynin is an antimuscarinic and would be contraindicated in this patient.

Pelvic floor exercises are used in the treatment of stress incontinence and are unlikely to have an effect in patients with pure urge incontinence.

Tolterodine is also an antimuscarinic and should not be used in a history of urinary retention.

Surgical repair would be used in patients with stress incontinence that has not improved with pelvic floor exercises and as such is not the correct answer.

Dr. Assem

A 36-year-old woman who presented with a goitre is diagnosed with autoimmune thyroiditis. Which one of the following types of thyroid cancer is she predisposed to developing?

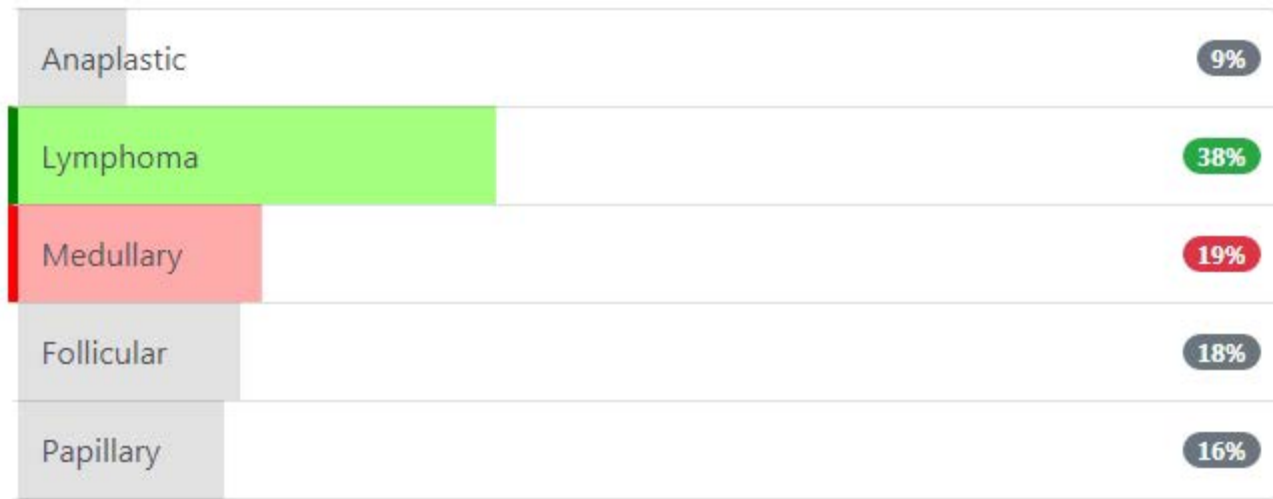
☐ Anaplastic

☐ Lymphoma

☐ Medullary

☐ Follicular

☐ Papillary



Hashimoto's thyroiditis is associated with thyroid lymphoma

Important for me Less important

An 80-year-old man is admitted with a 3 month history of gradual decline and dizziness on standing, followed by a 3 day history of inability to mobilise, general weakness and nausea. The medical consultant asks you to perform a short synacthen test which returns as normal. Which cause of adrenocortical insufficiency has not been excluded?

- ☐ Infiltration of the adrenal gland by amyloidosis
- ☐ Enlarging pituitary malignancy
- ☐ Haemorrhage into the adrenal gland
- ☐ Autoimmune adrenal failure
- ☐ Infiltration of the adrenal gland by tuberculosis

Infiltration of the adrenal gland by amyloidosis

9%

Enlarging pituitary malignancy

59%

Haemorrhage into the adrenal gland

15%

Autoimmune adrenal failure

12%

Infiltration of the adrenal gland by tuberculosis

6%

A normal short synacthen test does not exclude adrenocortical insufficiency due to pituitary failure

Important for me Less important

The short Synacthen test is a method of excluding adrenal insufficiency. A baseline cortisol level is taken, IV synthetic ACTH is then administered and a second cortisol level is taken 30 minutes later. If the cortisol post ACTH rises to > 420 nmol/L at 30 minutes, the adrenal response to ACTH is adequate and Addison's disease (adrenal failure) can be excluded.

However, this excludes only primary adrenal failure and does not exclude cortisol deficiency secondary to failure of the pituitary to produce ACTH. The correct answer is therefore pituitary failure due to damage by an enlarging malignancy. The other answers all cause damage to the adrenal gland.

NICE CKS: Addison's disease

<https://cks.nice.org.uk/addisons-disease>

Dr Assem

A 36-year-old female with a BMI of 34 kg/m^2 is reviewed after managing to lose 3 kg in the past month. She asks about the possibility of starting a drug to help her lose weight. What is the primary mode of action of orlistat?

- ☐ Leptin antagonist
- ☐ Pancreatic lipase inhibitor
- ☐ Prevents intestinal absorption of low-density lipoproteins
- ☐ HMG-CoA reductase inhibitor
- ☐ Centrally-acting appetite suppressant

Leptin antagonist

16%

Pancreatic lipase inhibitor

41%

Prevents intestinal absorption of low-density lipoproteins

28%

HMG-CoA reductase inhibitor

7%

Centrally-acting appetite suppressant

9%

The primary mode of action of orlistat is to inhibit pancreatic lipases, which in turn will decrease the absorption of lipids from the intestine

Dr. Assem

A 45-year-old woman presents with weight gain and recurrent 'dizzy' episodes. Over the past four months she has gained 20 kg. The episodes occur on an almost daily basis and are characterised by blurred vision, sweating, headaches and palpitations. Her GP checked a blood sugar during one of these episodes which was recorded as being 1.4 mmol/l. What is the single most useful test?

- ☐ Glucagon stimulation test
- ☐ Oral glucose tolerance test with growth hormone measurements
- ☐ Insulin + C-peptide levels during a hypoglycaemic episode
- ☐ Short ACTH test
- ☐ Insulin tolerance test

Glucagon stimulation test	6%
Oral glucose tolerance test with growth hormone measurements	12%
Insulin + C-peptide levels during a hypoglycaemic episode	65%
Short ACTH test	10%
Insulin tolerance test	7%

This patient has symptoms typical of an insulinoma. Whilst supervised fasting is normally the investigation of choice if this option is not given then insulin + C-peptide levels during an acute hypoglycaemic episode are useful.

A 32-year-old woman who is 24 weeks pregnant with her third child comes to the clinic for review. She has been diagnosed with gestational diabetes mellitus, and a fasting plasma glucose following 2 weeks of adherence to lifestyle changes is still elevated at 6.8 mmol/l. Her blood pressure is 122/82 mmHg, and her body mass index is 25 kg/m². She is reluctant to start insulin initially because her sister has Type 1 diabetes and suffers from frequent hypoglycaemia.

Which of the following is the most appropriate next intervention?

- ☐ Metformin
- ☐ Glibenclamide
- ☐ Insulin glargine
- ☐ Dapagliflozin
- ☐ Insulin pump therapy

Metformin	69%
Glibenclamide	6%
Insulin glargine	14%
Dapagliflozin	4%
Insulin pump therapy	7%

Metformin is the first line therapy of choice for diabetes in pregnancy

Important for me Less important

Metformin has been evaluated in a large Australasian trial for the treatment of gestational diabetes mellitus. Versus insulin initiation at the point of diagnosis, those patients treated with metformin gained less weight during pregnancy and suffered slightly fewer episodes of hypoglycaemia. There was no difference in the primary endpoint of adverse foetal outcomes, and women treated with metformin first preferred this option, even though most eventually progressed to insulin in addition to oral therapy. This has precipitated NICE to recommend metformin as a first line option where fasting glucose is less than 7.0 mmol/l despite dietary modification.

<https://www.nejm.org/doi/full/10.1056/NEJMoa0707193>

<https://www.nice.org.uk/guidance/ng3>

Although glibenclamide is safe in pregnancy it does not limit weight gain and control is inferior to insulin therapy. It's therefore only an option in patients who refuse metformin and insulin. Out of the insulin options listed, insulin pump therapy is preferred, although many women find it more difficult to comply with pump therapy and are therefore treated with a basal bolus regimen. There is no evidence to support the use of SGLT-2 inhibitors such as dapagliflozin in pregnancy. One problem which leads to diabetes is relative insulin resistance, which SGLT-2 inhibitors will not significantly impact upon.

An elderly male of no fixed abode with a history of alcohol dependency and chronic liver disease is taken to the Emergency Department with reduced consciousness (GCS 5) and a blood glucose of 1.3 mmol/L.

What is the correct management of his hypoglycaemia?

- ☐ IM Glucagon STAT
- ☐ Lucozade
- ☐ 100ml IV Normal Saline
- ☐ 100ml IV Dextrose 5%
- ☐ 100ml IV Glucose 20%

IM Glucagon STAT	26%
Lucozade	2%
100ml IV Normal Saline	2%
100ml IV Dextrose 5%	17%
100ml IV Glucose 20%	52%

Hypoglycaemia in patients with alcoholic liver disease does not respond to glucagon

Important for me Less important

Patients with alcoholic liver disease have depleted glycogen stores, therefore, treatment with glucagon does not improve blood glucose.

It is not safe to use the oral route when the patient is GCS 5, therefore, administering Lucozade is not appropriate.

Normal saline does not correct hypoglycaemia.

5% dextrose is a maintenance fluid and not appropriate for acute treatment of hypoglycaemia.

Therefore, the correct answer is 100ml IV Glucose 20%.

What is the mechanism of action of exenatide?

- ☐ Glucagon inhibitor
- ☐ Dipeptidyl peptidase-4 (DPP-4) inhibitor
- ☐ Glucagon-like peptide-1 (GLP-1) mimetic
- ☐ Incretin inhibitor
- ☐ Alpha-glucosidase inhibitor

Glucagon inhibitor

3%

Dipeptidyl peptidase-4 (DPP-4) inhibitor

12%

Glucagon-like peptide-1 (GLP-1) mimetic

77%

Incretin inhibitor

5%

Alpha-glucosidase inhibitor

3%

Exenatide = Glucagon-like peptide-1 (GLP-1) mimetic

Important for me Less important

An 85-year-old comes for review. She has recently had private health screening and has been advised to see a doctor regarding her thyroid function tests (TFTs).

TSH	9.2 mU/L
Free thyroxine	14 pmol/L

She is currently well and asymptomatic. What is the most appropriate management?

- ☐ Start levothyroxine
- ☐ Start carbimazole
- ☐ Order a thyroid ultrasound scan
- ☐ Start levothyroxine + carbimazole ('block and replace')
- ☐ Repeat TFTs in a few months time

Start levothyroxine

22%

Start carbimazole

4%

Order a thyroid ultrasound scan

10%

Start levothyroxine + carbimazole ('block and replace')

4%

Repeat TFTs in a few months time

60%

This patient has subclinical hypothyroidism. By both the TSH and age criteria advocated by NICE Clinical Knowledge Summaries she should be monitored for now.

What chromosome abnormality is associated with Klinefelter's syndrome?

☐ 47, XO

☐ 47, XXY

☐ 46, XXY

☐ 47, XYY

☐ 47, XXO

47, XO

7%

47, XXY

67%

46, XXY

15%

47, XYY

6%

47, XXO

4%

Klinefelter's - 47, XXY

Important for me

Less important

A 51-year-old woman who is known to have poorly controlled type 1 diabetes mellitus is reviewed. Her main presenting complaint is bloating and vomiting after eating. She also notes that her blood glucose readings have become more erratic recently. Which one of the following medications is most likely to be beneficial?

☐ *Helicobacter pylori* eradication therapy

☐ Lansoprazole

☐ Amitriptyline

☐ Metoclopramide

☐ Cyclizine

Helicobacter pylori

eradication therapy

9%

Lansoprazole

7%

Amitriptyline

6%

Metoclopramide

74%

Cyclizine

4%

A 33-year-old woman presents with weight loss and excessive sweating. her partner reports that she is 'on edge' all the time and during the consultation you notice a fine tremor. Her pulse rate is 96/min. A large, non-tender goitre is noted. Examination of her eyes is unremarkable with no evidence of exophthalmos.

Free T4	26 pmol/l
Free T3	12.2 pmol/l (3.0-7.5)
TSH	< 0.05 mu/l

What is the most likely diagnosis?

- ☐ Toxic multinodular goitre
- ☐ Hashimoto's thyroiditis
- ☐ T3-secreting adenoma
- ☐ De Quervain's thyroiditis
- ☐ Graves' disease

Toxic multinodular goitre

19%

Hashimoto's thyroiditis

8%

T3-secreting adenoma

7%

De Quervain's thyroiditis

7%

Graves' disease

59%

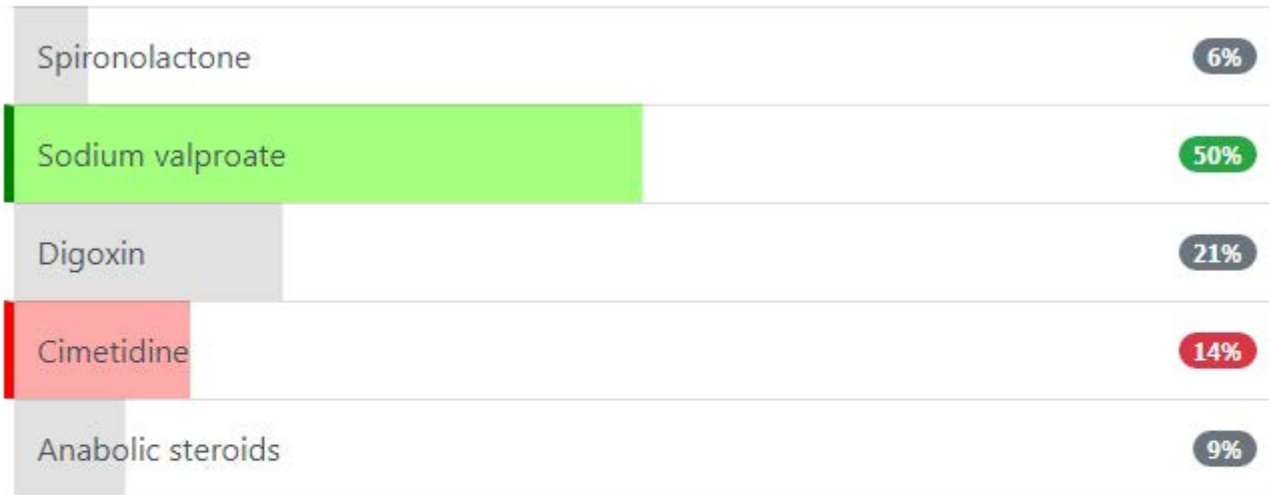
Graves' disease is the most common cause of thyrotoxicosis

Important for me Less important

Only around 30% of patients with Graves' disease have eye disease so the absence of eye signs does not exclude the diagnosis.

Which one of the following drugs is least likely to cause gynaecomastia?

- ☐ Spironolactone
- ☐ Sodium valproate
- ☐ Digoxin
- ☐ Cimetidine
- ☐ Anabolic steroids



Whilst sodium valproate may rarely causes gynecomastia it is much more common after taking the other listed drugs.

Dr Assem

A 56-year-old female is admitted to ITU with a severe pneumonia. Thyroid function tests are most likely to show:

- ☐ TSH normal; thyroxine high; T3 high
- ☐ TSH normal / low; thyroxine low; T3 low
- ☐ TSH high; thyroxine low; T3 low
- ☐ TSH low; thyroxine high; T3 high
- ☐ TSH high; thyroxine normal; T3 high

TSH normal; thyroxine high; T3 high

10%

TSH normal / low; thyroxine low; T3 low

62%

TSH high; thyroxine low; T3 low

10%

TSH low; thyroxine high; T3 high

8%

TSH high; thyroxine normal; T3 high

10%

What is the mechanism of action of thiazolidinediones?

- ☐ PPAR-gamma receptor antagonist
- ☐ PPAR-alpha receptor antagonist
- ☐ PPAR-alpha receptor agonist
- ☐ PPAR-gamma receptor agonist
- ☐ Increases endogenous insulin secretion

PPAR-gamma receptor antagonist

25%

PPAR-alpha receptor antagonist

11%

PPAR-alpha receptor agonist

18%

PPAR-gamma receptor agonist

42%

Increases endogenous insulin secretion

5%

Glitazones are agonists of PPAR-gamma receptors, reducing peripheral insulin resistance

Important for me Less important

A 45-year-old man is reviewed in the diabetes clinic. The following results are obtained:

Urinalysis	NAD
HbA1c	69 mmol/mol

Gliclazide is added to the metformin he already takes. What is the minimum time period after which the HbA1c should be repeated?

☐ 6 months

☐ 1 month

☐ 2 weeks

☐ 3 months

☐ 4 months



A more accurate answer would probably be 2 months but this is not given as an option.
See the explanation below

A 34-year-old female presents with fever and lower abdominal pain. Over the past five days she has noticed deep dyspareunia and some post-coital bleeding. Her last period began 10 days ago. She is diffusely tender in the suprapubic area and vaginal examination reveals cervical excitation. Endocervical swabs are taken. A diagnosis of pelvic inflammatory disease is suspected. What is the most appropriate management?

- ☐ Oral doxycycline
- ☐ Await endocervical swab results
- ☐ Oral amoxicillin + ciprofloxacin
- ☐ Oral doxycycline + ciprofloxacin
- ☐ Oral ofloxacin + metronidazole



Consensus guidelines recommend treatment once a diagnosis of pelvic inflammatory disease is suspected, rather than waiting for the results of swabs

Dr. Assem

A middle-aged man with type 2 diabetes mellitus is reviewed. Despite weight loss, metformin and gliclazide his HbA1c is 68 mmol/mol (8.4%). The patient agrees to start insulin therapy. According to NICE guidelines which type of insulin should be tried initially?

- ☐ Basal bolus regime
- ☐ Isophane (NPH insulin)
- ☐ Biphasic insulin
- ☐ Glargine
- ☐ Detemir

Basal bolus regime	33%
Isophane (NPH insulin)	38%
Biphasic insulin	13%
Glargine	12%
Detemir	5%

from NICE Clinical Knowledge Summaries:

The National Institute for Health and Care Excellence (NICE) recommends that in adults with type 2 diabetes:

- *Neutral Protamine Hagedorn (NPH) insulin [also known as isophane insulin] (injected once or twice daily according to need) should be offered.*
- *NPH plus a short-acting insulin should be considered (particularly if the person's HbA1c is 75 mmol/mol [9.0%] or higher). This may be administered either separately or as a pre-mixed (biphasic) human insulin preparation.*
- *Insulin detemir or insulin glargine should be considered as an alternative to NPH insulin if:*
 - *The person needs assistance from a carer or healthcare professional to inject insulin and the use of insulin detemir or insulin glargine would reduce the frequency of injections from twice to once daily, or*
 - *The person's lifestyle is restricted by recurrent symptomatic hypoglycaemic episodes, or*
 - *The person would otherwise need twice-daily NPH insulin injections in combination with oral antidiabetic drugs.*

A 68-year-old female with a background of stage four chronic kidney disease (CKD) presents with the following blood results to the nephrology clinic. She has had progressive CKD over many years following a diagnosis of IgA nephropathy in her third decade.

PTH	19.1 pmol/l (1.05 - 6.83)
Adjusted calcium	2.84 mmol/l (2.1-2.6)

What endocrine abnormality is she most likely to have given her background?

- ☐ Tertiary hyperparathyroidism
- ☐ Secondary hyperparathyroidism
- ☐ Multiple endocrine neoplasia 1 (MEN1)
- ☐ Pseudohypoparathyroidism
- ☐ Primary hyperparathyroidism

Tertiary hyperparathyroidism	50%
Secondary hyperparathyroidism	29%
Multiple endocrine neoplasia 1 (MEN1)	5%
Pseudohypoparathyroidism	4%
Primary hyperparathyroidism	11%

The correct answer is tertiary hyperparathyroidism. The PTH level is inappropriate given the high calcium level indicating autonomous hypersecretion of PTH. Although such results could be possible with primary hyperparathyroidism, the long history of renal impairment points towards tertiary hyperparathyroidism as the hypertrophied parathyroid glands no longer respond to serum calcium levels. Tertiary hyperparathyroidism occurs after long term secondary hyperparathyroidism.

Primary hyperparathyroidism

- PTH over-secretion usually from a parathyroid adenoma
- both PTH and calcium are elevated
- surgery to remove the adenoma is the most effective treatment
- conservative measures such as bisphosphonates can be used

Secondary hyperparathyroidism

- occurs in chronic kidney disease typically
- can be secondary to vitamin D deficiency
- PTH released due to low calcium, high phosphate and lack of vitamin D activation by diseased kidneys
- PTH level high with calcium levels being low or normal
- medical management primarily: phosphate binders, calcium and vitamin D supplementation

Tertiary hyperparathyroidism

- autonomous hypersecretion of PTH due to hypertrophied parathyroid glands
- occurs after a period of long standing secondary hyperparathyroidism
- treatment involves parathyroidectomy

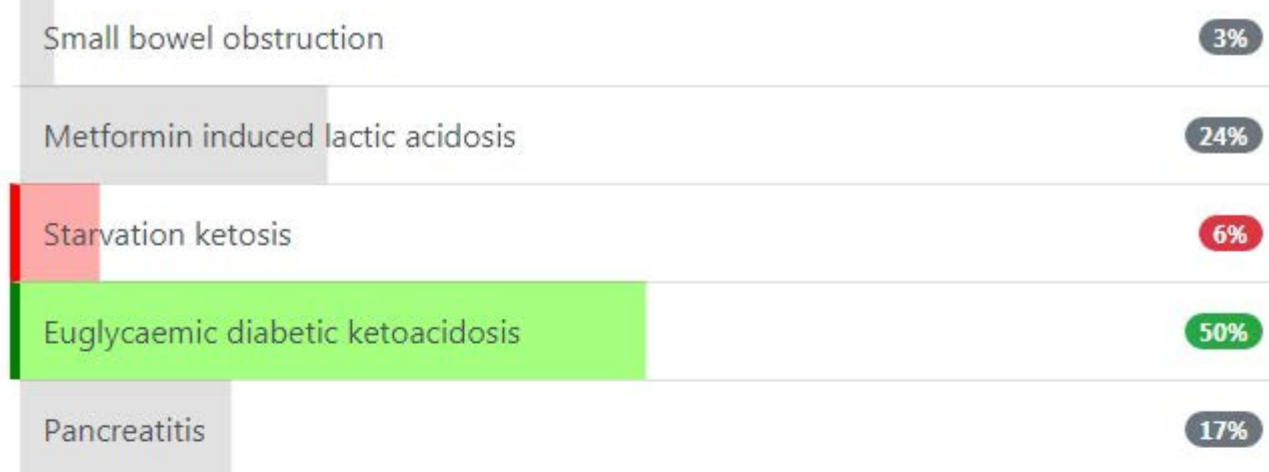
Pseudohypoparathyroidism is caused by PTH resistance and is associated with low calcium and high PTH levels. MEN1 is a rare hereditary disorder involving multiple types of endocrine tissue neoplasia.

You have been asked to review a 52-year-old woman in the emergency department with dyspnoea accompanied by nausea and vomiting. She tells you that she initially attributed this to a flu-like illness but as she found herself becoming increasingly short of breath she was taken to hospital by her concerned husband. Her past medical history is significant for type 2 diabetes mellitus, hypertension and obesity. Her current medications include metformin 1gram bd, canagliflozin 100mg od, ramipril 10mg od and amlodipine 5mg od. On examination she has a respiratory rate of 25 breaths/min, blood pressure 130/67 mmHg, pulse 105 bpm and oxygen saturation of 98% on room air. The only finding you elicit on physical examination is mild tenderness in the epigastric area. Her ECG shows a sinus tachycardia. Routine blood results are shown below:

Hb	167 g/l	Na ⁺	132 mmol/l	Bilirubin	22 µmol/l	pH	7.14
Platelets	410 * 10 ⁹ /l	K ⁺	5.5 mmol/l	ALP	100 u/l	PaO ₂	12 KPa
WBC	11.2 * 10 ⁹ /l	Urea	10.4 mmol/l	ALT	55 u/l	PaCO ₂	1.9 KPa
Neuts	10.0 * 10 ⁹ /l	Creatinine	111 µmol/l	γGT	23 u/l	HCO ₃ ⁻	11µmol/l
Lymphs	1.1 * 10 ⁹ /l	Amylase	321 U/l	Albumin	33 g/l	Lactate	3.0 mmol/l
Eosin	0.1 * 10 ⁹ /l	Cl ⁻	101 mmol/l	Urine	Ketones 3+	Glucose	11mmol/L

What is the most likely diagnosis?

- ☒ Small bowel obstruction
- ☐ Metformin induced lactic acidosis
- ☐ Starvation ketosis
- ☐ Euglycaemic diabetic ketoacidosis
- ☐ Pancreatitis



This lady has euglycaemic diabetic ketoacidosis (EuDKA) secondary to her sodium-glucose co-transporter 2 (SGLT2) inhibitor, canagliflozin. EuDKA is an important to recognise side effect of this novel class of oral hypoglycaemic agents and should be thought of in any patient with an unexplained raised anion gap acidosis and normal blood sugar level who is on one of these medications.

Exactly how these agents cause EuDKA has yet to be determined. However, it is hypothesised that as these agents lower blood sugar levels by increasing the excretion of glucose the resulting reduction in plasma glucose results in reduced insulin secretion from pancreatic beta-cells and these patients entering a state of relative insulin deficiency. This leads to a lowering of the antilipolytic activity of insulin, and the consequent stimulation of the production of free fatty acids, which are then converted to ketone bodies by beta-oxidation in the liver. Moreover, insulin stimulates the activity of acetyl-CoA carboxylase, which produces malonyl-CoA, a potent inhibitor of carnitine palmitoyltransferase (CPT-I). Given that CPT-I promotes the transport of fatty acids into mitochondria and hence increases the rate of beta-oxidation, the decrease in the circulating level of insulin promotes the production of ketone bodies through activation of CPT-I.

Dr. Assam

A 53-year-old female with a history of primary atrophic hypothyroidism is assessed two months following a change in her dose of levothyroxine. Which one of the following best describes what the TSH should ideally be?

- ☐ Between 0.5 to 1.0 mU/l
- ☐ Between 0.5 to 2.5 mU/l
- ☐ Between 2.5 to 4.5 mU/l
- ☐ Between 1.5 to 3.5 mU/l
- ☐ Between 3.5 to 5.5 mU/l

Between 0.5 to 1.0 mU/l

8%

Between 0.5 to 2.5 mU/l

49%

Between 2.5 to 4.5 mU/l

15%

Between 1.5 to 3.5 mU/l

14%

Between 3.5 to 5.5 mU/l

14%

A TSH value between 0.5 to 2.5 mU/l is now considered preferable. Dosage changes should of course also take account of symptoms

A 45-year-old woman is investigated for weight gain. She had had been unwell for around four months and described a combination of symptoms including depression, facial male-pattern hair growth and reduced libido. During the work-up she was found to be hypertensive with a blood pressure of 170/100 mmHg. Which one of the following tests is most likely to be diagnostic?

- ☐ Renin:aldosterone levels
- ☐ High-dose dexamethasone suppression test
- ☐ Pelvic ultrasound
- ☐ Overnight dexamethasone suppression test
- ☐ 24 hr urinary free cortisol

Renin:aldosterone levels

10%

High-dose dexamethasone suppression test

11%

Pelvic ultrasound

15%

Overnight dexamethasone suppression test

47%

24 hr urinary free cortisol

18%

The overnight dexamethasone suppression test is the best test to diagnosis Cushing's syndrome

Important for me Less important

This patient has Cushing's syndrome as evidenced by the weight gain, hirsutism, depression and hypertension. Polycystic ovarian syndrome may give some of these features but would not cause such an elevated blood pressure.

Which of the following statements is true regarding the pathophysiology of diabetes mellitus?

- ☐ Concordance between identical twins is higher in type 2 diabetes mellitus than type 1
- ☐ Patients with type 1 diabetes mellitus are rarely HLA-DR4 positive
- ☐ Type 2 diabetes mellitus is associated with HLA-DR3
- ☐ Haemochromatosis is an example of primary diabetes
- ☐ Type 1 diabetes mellitus is thought to be inherited in an autosomal dominant fashion

Concordance between identical twins is higher in type 2 diabetes mellitus than type 1

55%

Patients with type 1 diabetes mellitus are rarely HLA-DR4 positive

11%

Type 2 diabetes mellitus is associated with HLA-DR3

16%

Haemochromatosis is an example of primary diabetes

6%

Type 1 diabetes mellitus is thought to be inherited in an autosomal dominant fashion

12%

Type 1 diabetes mellitus is caused by autoimmune destruction of the Beta-cells of the pancreas. Identical twins show a genetic concordance of 40%. It is associated with HLA-DR3 and DR4. It is inherited in a polygenic fashion

Type 2 diabetes mellitus is thought to be caused by a relative deficiency of insulin and the phenomenon of insulin resistance. Age, obesity and ethnicity are important aetiological factors. There is almost 100% concordance in identical twins and no HLA associations.

Haemochromatosis is an example of secondary diabetes

The fasting glucose for a patient is reported as follows:

Glucose (fasting)	6.3 mmol/l
--------------------------	-------------------

What is the most likely underlying pathophysiological change?

- ☐ Beta-cell hyperplasia
- ☐ Beta-cell atrophy
- ☐ Muscle insulin resistance
- ☐ Hepatic insulin resistance
- ☐ Adipose tissue insulin resistance

Beta-cell hyperplasia

8%

Beta-cell atrophy

8%

Muscle insulin resistance

16%

Hepatic insulin resistance

43%

Adipose tissue insulin resistance

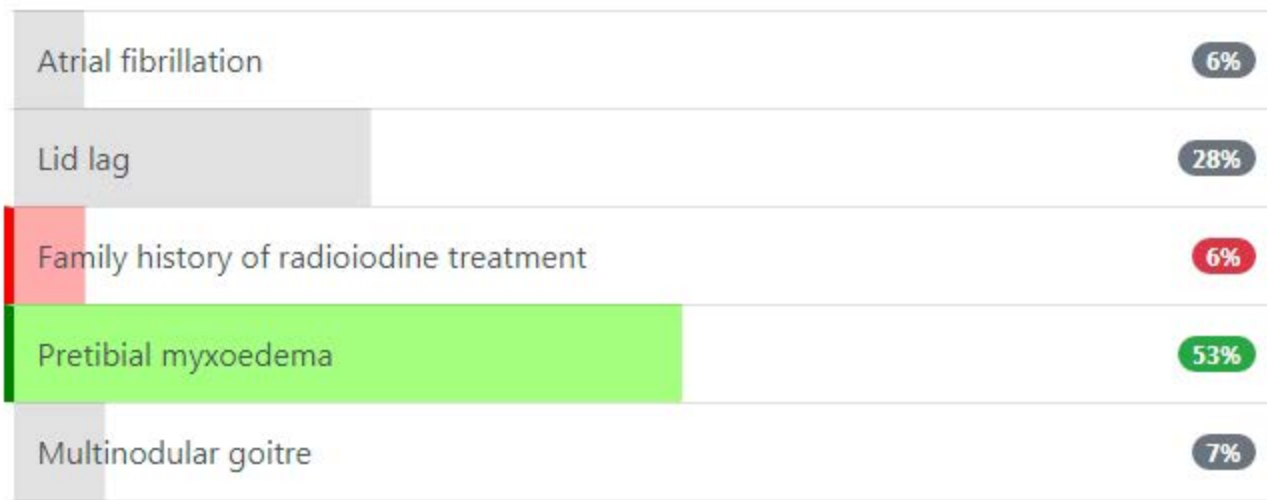
25%

A 35-year-old female is referred to the endocrine clinic due to weight loss and palpitations. The following results are obtained:

TSH	< 0.05 mu/l
T4	178 mmol/l

Which one of the following features would most suggest a diagnosis of Grave's disease?

- ☐ Atrial fibrillation
- ☐ Lid lag
- ☐ Family history of radioiodine treatment
- ☐ Pretibial myxoedema
- ☐ Multinodular goitre



Pretibial myxoedema is not seen in other causes of thyrotoxicosis and points towards a diagnosis of Graves'

A 26-year-old obese female is investigated for menstrual disturbance. A diagnosis of polycystic ovarian syndrome is made. Which of the following findings is most consistently seen in polycystic ovarian syndrome?

- ☐ Obesity
- ☐ Hirsutism
- ☐ Ovarian cysts on ultrasound
- ☐ Raised LH:FSH ratio
- ☐ Clitoromegaly



Polycystic ovarian syndrome - ovarian cysts are the most consistent feature

Important for me Less important

Whilst all of the features listed above may be seen in polycystic ovarian syndrome, ovarian cysts are the most consistent feature.

Each one of the following is seen in Klinefelter's syndrome, except:

- ☐ Small, firm testes
- ☐ Lack of secondary sexual characteristics
- ☐ Infertility
- ☐ Increased incidence of breast cancer
- ☐ Reduced gonadotrophin levels

Small, firm testes

8%

Lack of secondary sexual characteristics

8%

Infertility

9%

Increased incidence of breast cancer

29%

Reduced gonadotrophin levels

46%

Klinefelter's syndrome - elevated gonadotrophin levels

Important for me Less important

You review a 68-year-old man who has chronic obstructive pulmonary disease (COPD). Each year he typically has around 7-8 courses of oral prednisolone to treat infective exacerbations of his COPD. Which one of the following adverse effects is linked to long-term steroid use?

- ☐ Osteomalacia
- ☐ Enophthalmos
- ☐ Leucopaenia
- ☐ Avascular necrosis
- ☐ Constipation



Long-term corticosteroid use is linked to osteopaenia and osteoporosis, rather than osteomalacia.

Each one of the following is a feature of pseudohypoparathyroidism, except:

- ☐ Short fourth and fifth metacarpals
- ☐ Round face
- ☐ Normal calcium and phosphate levels
- ☐ Cognitive impairment
- ☐ Short stature

Short fourth and fifth metacarpals

6%

Round face

21%

Normal calcium and phosphate levels

62%

Cognitive impairment

7%

Short stature

4%

A 48-year-old male presents to the clinic. He complains of excessive flatulence following starting a new agent for management of his type 2 diabetes mellitus. He has no other past medical history.

What drug is most likely implicated?

- ☐ Metformin
- ☐ Gliclazide
- ☐ Acarbose
- ☐ Sitagliptin
- ☐ Empagliflozin

Metformin	33%
Gliclazide	7%
Acarbose	46%
Sitagliptin	7%
Empagliflozin	7%

Excessive flatulence is an extremely common side effect of acarbose which is often poorly tolerated

Important for me ☐ Less important ☐

Acarbose is an inhibitor of intestinal alpha glucosidases, which results in decreased absorption of starch and sucrose. Since acarbose prevents the degradation and absorption of complex carbohydrates into glucose, an increased carbohydrate load will be delivered to the colon. In the colon, bacteria digest the complex carbohydrates, causing gastrointestinal side-effects such as flatulence and diarrhoea. Excessive flatulence is the most commonly reported side effect and is often the reason for discontinuation of the drug.

Metformin can also cause gastrointestinal side effects, however it is often diarrhoea rather than excessive flatulence, making acarbose the better answer.

Gliclazide is a sulphonylurea agent. The sulphonylureas act mainly by augmenting insulin secretion and consequently are effective only when some residual pancreatic beta-cell activity is present; during long-term administration they also have an extrapancreatic action. Side effects include hypoglycaemia, cholestatic jaundice and diarrhoea.

Sitagliptin is a dipeptidyl peptidase-4 (DPP-4) inhibitor. Side effects include peripheral oedema and diarrhoea.

Empagliflozin is an inhibitor of the sodium glucose co-transporter-2 (SGLT-2). It causes increased glucose excretion in the urine which predisposes to recurrent urinary tract infections.

A 35-year-old gentleman is followed up in general practice after a routine health check at work has identified high blood pressure. He has been started on initial anti-hypertensive therapy whilst awaiting investigation. He is otherwise well with no past medical history of note.

He reports that his grandfather had been previously diagnosed with Conn's syndrome at an early age.

Which of the following can interfere with testing for primary hyperaldosteronism?

- ☐ Digoxin
- ☐ Amlodipine
- ☐ Ivabradine
- ☐ Bisoprolol
- ☐ Ramipril

Digoxin

7%

Amlodipine

8%

Ivabradine

7%

Bisoprolol

8%

Ramipril

71%

The answer here is ramipril. The reason behind this is due to its interference with the renin-angiotensin-aldosterone system, for which the other medications do not.

Medications that can cause false negative renin:aldosterone ratio results are the following:

- Angiotensin-converting enzyme inhibitors (e.g. ramipril or lisinopril).
- Angiotensin receptor blockers (e.g. losartan).
- Direct renin inhibitors (e.g. aliskiren).
- Aldosterone antagonists (e.g. spironolactone or eplerenone).

An 18-year-old man presents to the nurse at the local health centre with a third episode of balanitis over the past 3 months. He also has vague symptoms of tiredness. His father and grandfather were diagnosed with type 1 diabetes and take a basal-bolus insulin regimen. He is slim with a body mass index of 22 kg/m². He is noted to have glycosuria on urine dipstick testing.

Investigations:

Na ⁺	140 mmol/l
K ⁺	3.9 mmol/l
Urea	6.1 mmol/l
Creatinine	91 µmol/l
Glucose	9.2 mmol/l

Which of the following is the most likely diagnosis?

- ☐ Latent autoimmune diabetes of adults (LADA)
- ☐ Maturity onset diabetes of the young (MODY)
- ☐ Renal glycosuria
- ☐ Type 1 diabetes
- ☐ Type 2 diabetes

Dr Assem

Latent autoimmune diabetes of adults (LADA)	16%
Maturity onset diabetes of the young (MODY)	48%
Renal glycosuria	7%
Type 1 diabetes	25%
Type 2 diabetes	5%

MODY is autosomal dominant diabetes mellitus which often presents for the first time in young slim individuals without symptoms of polyuria and polydipsia. Insidious onset with for instance with recurrent balanitis as here is usual. It's important to recognise the diagnosis because many patients with MODY including those with the HNF-1 alpha form of the disease can be managed with sulphonylureas for many years before needing to start insulin therapy. Evaluation of family history and testing for antibodies for type 1 diabetes can help to differentiate MODY from other forms of diabetes mellitus.

Type 1 diabetes isn't associated with such strong heritability as that seen here, and given this patient's body habitus, type 2 diabetes is very unlikely. LADA is associated with a body habitus similar to the overweight / obese picture seen in type 2 diabetes for many patients, although progression to insulin therapy occurs more quickly. Renal glycosuria is ruled out by the elevated fasting glucose seen here.

A 21-year-old with type 1 diabetes was admitted with abdominal pain and vomiting. She had been having dysuria and urine dip showed ++ nitrites and ++ leucocytes. Her heart rate was 90 bpm and blood pressure was 112/80 mmHg. Capillary glucose was 28 mmol/l and capillary ketones were 5.1 mmol/l. A venous gas was obtained which showed:

pH	7.25
Bicarbonate	12 mmol/l
Base excess	-3.8
Lactate	2.9 mmol/l
Potassium	6.0 mmol/l

She was started on IV fluids and fixed-rate IV insulin. Her capillary glucose and ketones had improved significantly after 24 hours of treatment, however she gradually started to become confused, irritable and was slurring her words. A repeat venous gas showed:

pH	7.32
Bicarbonate	17 mmol/l
Base excess	-2.0
Lactate	2.3 mmol/l
Potassium	3.1 mmol/l

What is the most likely cause of her new neurological symptoms?

☐ Stroke

☐ Encephalopathy

☐ Cerebral oedema

☐ Sepsis

☐ Hypokalaemia

Dr Assem

Stroke

3%

Encephalopathy

4%

Cerebral oedema

76%

Sepsis

6%

Hypokalaemia

12%

Cerebral oedema is an important complication of fluid resuscitation in DKA, especially in young patients

Important for me Less important

Children/young adults are particularly vulnerable to cerebral oedema following fluid resuscitation in DKA and often need 1:1 nursing to monitor neuro-observations, headache, irritability, visual disturbance, focal neurology etc.

It usually occurs 4-12 hours following commencement of treatment but can be present at any time.

If any suspicion, request a CT head and call senior immediately.

Dr Assem

One of your patients is diagnosed with having the metabolic syndrome. Which one of the following is associated with this condition?

- ☐ Endometriosis
- ☐ Hypothyroidism
- ☐ Asymptomatic rise in amylase levels
- ☐ Elevated albumin levels
- ☐ Raised uric acid levels

Endometriosis

6%

Hypothyroidism

25%

Asymptomatic rise in amylase levels

9%

Elevated albumin levels

5%

Raised uric acid levels

55%

A 46-year-old woman is referred to endocrine with a tender neck swelling. Blood results are as follows:

TSH	<0.1 mU/l
T4	188 nmol/l
Hb	14.2 g/dl
Plt	$377 \times 10^9/l$
WBC	$6.4 \times 10^9/l$
ESR	65 mm/hr

Technetium thyroid scan shows decreased uptake globally

What is the most likely diagnosis?

- ☐ Sick thyroid syndrome
- ☐ Acute bacterial thyroiditis
- ☐ Hashimoto's thyroiditis
- ☐ Subacute thyroiditis
- ☐ Toxic multinodular goitre



Subacute thyroiditis is suggested by the tender goitre, hyperthyroidism and raised ESR. The globally reduced uptake on technetium thyroid scan is also typical

Which one of the following processes is responsible for ketone production during diabetic ketoacidosis?

- ☐ Glycogenolysis
- ☐ Exchange with hydrogen ions in the collecting ducts
- ☐ Gluconeogenesis
- ☐ Decreased plasma bicarbonate levels
- ☐ Lipolysis

Glycogenolysis

12%

Exchange with hydrogen ions in the collecting ducts

4%

Gluconeogenesis

11%

Decreased plasma bicarbonate levels

3%

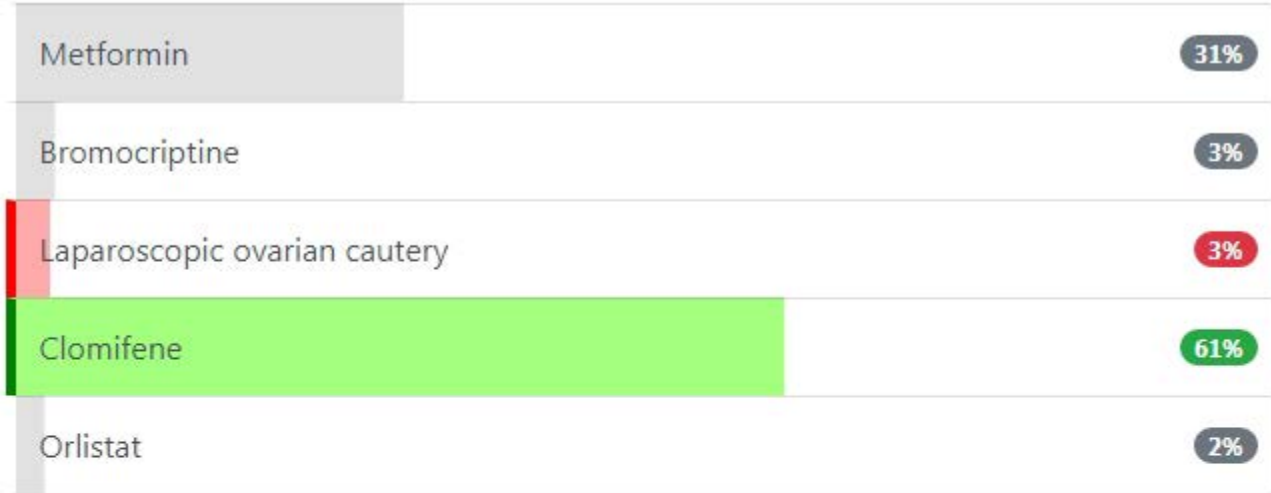
Lipolysis

70%

The low-insulin conditions seen in diabetic ketoacidosis stimulate the process of lipolysis and the production of the ketone bodies, beta-hydroxybutyrate and acetoacetate, which can be used as metabolic fuel.

A 28-year-old woman with polycystic ovarian syndrome consults you as she is having problems becoming pregnant. She has a past history of oligomenorrhea and has previously recently stopped taking a combined oral contraceptive pill. Despite stopping the pill 6 months ago she is still not having regular periods. Her body mass index is 28 kg/m². Apart from advising her to lose weight, which one of the following interventions is most effective in increasing her chances of conceiving?

- ☐ Metformin
- ☐ Bromocriptine
- ☐ Laparoscopic ovarian cauterization
- ☐ Clomifene
- ☐ Orlistat



Infertility in PCOS - clomifene is superior to metformin

Important for me Less important

Whilst metformin has a role in the management of infertility it should be used second-line to anti-oestrogens such as clomifene. Similar questions to this often appear in which clomifene is not an option, in this case metformin is clearly the right answer.

Dr. Assou

A 39-year-old woman is reviewed in the clinical pharmacology clinic following referral by her GP for management of her hypertension. She has a blood pressure of 159/90 mmHg despite 3 oral anti-hypertensive medications including full dose ramipril. Examination in the clinic confirms the elevated blood pressure. Her pulse is 72 and regular. Her chest is clear and her abdomen is soft and non-tender with no palpable masses. Her body mass index is 28 kg/m².

Hb	130 g/l
Platelets	221 * 10 ⁹ /l
WBC	6.0 * 10 ⁹ /l

Na ⁺	141 mmol/l
K ⁺	3.1 mmol/l
Bicarbonate	31 mmol/l
Urea	4.1 mmol/l
Creatinine	102 µmol/l
Calcium	2.45 mmol/l

CT abdomen: Right adrenal adenoma, thick walled gallbladder with a solitary stone

Which of the following is the most likely diagnosis?

- ☐ Conn's syndrome
- ☐ Cushing's syndrome
- ☐ Essential hypertension
- ☐ Pheochromocytoma
- ☐ Renal artery stenosis

Conn's syndrome	69%
Cushing's syndrome	12%
Essential hypertension	2%
Phaeochromocytoma	14%
Renal artery stenosis	3%

The relatively normal weight, coupled with hypertension and hypokalaemic metabolic alkalosis fits well with a diagnosis of Conn's syndrome, (primary hyperaldosteronism). The right adrenal adenoma is the likely source of excess aldosterone production. In the presence of an ACE inhibitor prescribed for hypertension, significant hypokalaemia is very likely to be related to Conn's.

Cushing's syndrome is unlikely given that the body mass index is only slightly elevated, and the presence of an adrenal adenoma and biochemical abnormalities effectively rules out essential hypertension. Phaeochromocytoma may be associated with hypokalaemia, but is more likely to be associated with episodic hypertension associated with bursts of catecholamine release. In renal artery stenosis, a significant rise in creatinine would be expected in association with the introduction of the ramipril.

A 53 year man presents as his wife has noticed a change in his appearance. He has also noticed his hands seem larger. On examination blood pressure is 170/94 and he is noted to have bitemporal hemianopia. What is the most appropriate first-line treatment?

- ☐ Octreotide
- ☐ External irradiation
- ☐ Pegvisomant
- ☐ Trans-sphenoidal surgery
- ☐ Bromocriptine



Trans-sphenoidal surgery is the treatment of choice in acromegaly. There is no significant evidence base supporting the use of pre-operative octreotide

A 49-year-old woman is investigated for thyrotoxicosis. On examination she is noted to have a goitre containing multiple irregular nodules. Nuclear scintigraphy with technetium 99m reveals patchy uptake. What is the treatment of choice?

- ☐ Corticosteroids
- ☐ Radioiodine
- ☐ Block-and-replace regime
- ☐ Surgery
- ☐ Anti-thyroid drug titration regime

Corticosteroids

5%

Radioiodine

43%

Block-and-replace regime

13%

Surgery

25%

Anti-thyroid drug titration regime

15%

A 45-year-old woman with Graves' disease comes for review. She has recently been diagnosed with thyroid eye disease and is being considered for radiotherapy. Over the past three days her right eye has become red and painful. On examination there is proptosis and erythema of the right eye. Visual acuity is 6/9 in both eyes. What complication is she most likely to have developed?

- ☐ Exposure keratopathy
- ☐ Optic neuropathy
- ☐ Carbimazole-related neutropaenia
- ☐ Central retinal vein occlusion
- ☐ Sjogren's Syndrome

Exposure keratopathy

70%

Optic neuropathy

11%

Carbimazole-related neutropaenia

6%

Central retinal vein occlusion

9%

Sjogren's Syndrome

4%

Which one of the following types of thyroid cancer is associated with the RET oncogene?

- ☐ Anaplastic
- ☐ Lymphoma
- ☐ Follicular
- ☐ Medullary
- ☐ All types of thyroid cancer



The RET oncogene encodes a receptor tyrosine kinase and is associated with MEN type 2.

Papillary thyroid cancer also appears to be associated with the RET oncogene

The first-line treatment in remnant hyperlipidaemia (dysbetalipoproteinaemia) is:

- ☐ Ursodeoxycholic acid
- ☐ Vitamin A
- ☐ Statins
- ☐ Fish oil
- ☐ Fibrates

Ursodeoxycholic acid

11%

Vitamin A

4%

Statins

30%

Fish oil

7%

Fibrates

47%

Dr. Arsem

A 20-year-old woman with a history of type 1 diabetes since the age of 8 comes to the Emergency department with nausea, vomiting, weight loss and frequent episodes of hypoglycaemia. She has been treated with a basal bolus regime of insulin since diagnosis and usually has very stable diabetes control. On examination, her blood pressure is 105/70 mmHg with a postural drop of 15 mmHg. Her pulse is 74 beats per minute and regular. Her body mass index is 21 kg/m².

Investigations

Na ⁺	127 mmol/l
K ⁺	5.0 mmol/l
Urea	11.2 mmol/l
Creatinine	122 µmol/l
Glucose	4.8 mmol/l
TSH	10.2 IU/l
Free thyroxine	7 pmol/l

Which of the following is the most important intervention?

- ☐ Fluid restriction
- ☐ IV hydrocortisone
- ☐ IV normal saline
- ☐ Oral fludrocortisone
- ☐ Oral thyroxine

Fluid restriction	5%
IV hydrocortisone	60%
IV normal saline	17%
Oral fludrocortisone	8%
Oral thyroxine	10%

The hyponatraemia and potassium towards the upper end of the normal range, coupled with hypoglycaemia, fit well with a diagnosis of Addison's disease. Although features of hypothyroidism may co-exist with hypoadrenalism, corticosteroid replacement is the most important first step in therapy because commencing thyroxine may worsen any adrenal crisis.

Fluid restriction is not appropriate given signs of volume depletion and the likelihood of Addison's being the primary diagnosis. Although fluid replacement with normal saline may be useful in relieving symptoms of volume depletion, it is unlikely to be effective without commencing hydrocortisone therapy. Oral fludrocortisone is added to hydrocortisone in patients who are corticosteroid replete but still suffer from symptoms of hyponatraemia or volume depletion.

Dr Assem

What causes increased sweating in patients with acromegaly?

- ☐ Increased sodium content in sweat
- ☐ Raised basal metabolic rate
- ☐ Episodic hypoglycaemia
- ☐ Low-grade chronic pyrexia
- ☐ Sweat gland hypertrophy

Increased sodium content in sweat

5%

Raised basal metabolic rate

25%

Episodic hypoglycaemia

6%

Low-grade chronic pyrexia

2%

Sweat gland hypertrophy

61%

Acromegaly: increased sweating is caused by sweat gland hypertrophy

Important for me

Less important

A 52-year-old man has a set of fasting bloods as part of a work-up for hypertension. The fasting glucose comes back as 6.5 mmol/l. The test is repeated and reported as 6.7 mmol/l. He says he feels constantly tired but denies any polyuria or polydipsia. How should these results be interpreted?

- ☐ Impaired fasting glycaemia
- ☐ Suggestive of diabetes mellitus but not diagnostic
- ☐ Diabetes mellitus
- ☐ Normal
- ☐ Impaired glucose tolerance

A 52-year-old man has a set of fasting bloods as part of a work-up for hypertension. The fasting glucose comes back as 6.5 mmol/l. The test is repeated and reported as 6.7 mmol/l. He says he feels constantly tired but denies any polyuria or polydipsia. How should these results be interpreted?

Impaired fasting glycaemia

72%

Suggestive of diabetes mellitus but not diagnostic

4%

Diabetes mellitus

7%

Normal

8%

Impaired glucose tolerance

9%

A 40-year-old man presents to the GP concerned about his risk of developing cancer. You notice that he has large spade-like hands, a prominent forehead and nose, and thick skin. Which of the following cancers is he at increased risk of developing?

- ☐ Pancreatic carcinoma
- ☐ Colorectal carcinoma
- ☐ Adrenal carcinoma
- ☐ Malignant melanoma
- ☐ Lung cancer

Pancreatic carcinoma

7%

Colorectal carcinoma

74%

Adrenal carcinoma

10%

Malignant melanoma

4%

Lung cancer

4%

Patients with acromegaly have an increased risk of colorectal carcinoma

Important for me Less important

Patients with acromegaly have an increased incidence of colorectal polyps and carcinoma. This is a fairly recent finding, now that patients with acromegaly are surviving longer due to better management of their other complications, particularly diabetes and cardiovascular disease. It is recommended that patients with acromegaly have an initial colonoscopy at age 40, and enter a surveillance program based on the results of the colonoscopy.

Guidelines for colorectal cancer screening and surveillance in moderate and high risks.
Update

<https://www.ncbi.nlm.nih.gov/pubmed/20427401>

Dr Assem

A 16-year-old male is reviewed in the endocrinology clinic due to lack of pubertal development. On examination his testes are undescended and there is only scanty pubic hair. What is the most likely diagnosis?

- ☐ Down's syndrome
- ☐ Kallman's syndrome
- ☐ Dubin-Johnson syndrome
- ☐ Turner's syndrome
- ☐ Klinefelter's syndrome

Down's syndrome

3%

Kallman's syndrome

43%

Dubin-Johnson syndrome

4%

Turner's syndrome

6%

Klinefelter's syndrome

44%

Cryptorchidism is more suggestive of Kallman's than Klinefelter's syndrome

Which of the following results establishes a diagnosis of diabetes mellitus?

- ☐ Asymptomatic patient with fasting glucose 7.9 mmol/L on one occasion
- ☐ Symptomatic patient with fasting glucose 6.8 mmol/L on two occasions
- ☐ Glycosuria +++
- ☐ Asymptomatic patient with random glucose 22.0 mmol/L on one occasion
- ☐ Symptomatic patient with random glucose 12.0 mmol/L on one occasion

Asymptomatic patient with fasting glucose 7.9 mmol/L on one occasion	11%
Symptomatic patient with fasting glucose 6.8 mmol/L on two occasions	17%
Glycosuria +++	4%
Asymptomatic patient with random glucose 22.0 mmol/L on one occasion	10%
Symptomatic patient with random glucose 12.0 mmol/L on one occasion	58%

Diabetes diagnosis: fasting > 7.0, random > 11.1 - if asymptomatic need two readings

Important for me Less important

A 61-year-old woman is investigated for hoarseness and dyspnoea which has got progressively worse over the past month. In the past she has been diagnosed with toxic multinodular goitre which was successfully treated with radioiodine. On examination she has a firm, asymmetrical swelling of the thyroid gland. Laryngoscopy demonstrates a right vocal cord paralysis and apparent external compression of the trachea. What is the most likely diagnosis?

- ☐ Follicular thyroid cancer
- ☐ Papillary thyroid cancer
- ☐ Medullary thyroid cancer
- ☐ Lymphoma of the thyroid gland
- ☐ Anaplastic thyroid cancer

Follicular thyroid cancer

8%

Papillary thyroid cancer

10%

Medullary thyroid cancer

7%

Lymphoma of the thyroid gland

8%

Anaplastic thyroid cancer

67%

Anaplastic thyroid cancer - aggressive, difficult to treat and often causes pressure symptoms

Important for me Less important

Which one of the following statements regarding maturity-onset diabetes of the young (MODY) is true?

- ☐ There is usually a strong family history
- ☐ Body mass index is typically > 30
- ☐ Doesn't respond to glimepiride
- ☐ Autosomal recessive inheritance
- ☐ Frequent episodes of diabetic ketoacidosis are typical

There is usually a strong family history

76%

Body mass index is typically > 30

5%

Doesn't respond to glimepiride

4%

Autosomal recessive inheritance

8%

Frequent episodes of diabetic ketoacidosis are typical

6%

What is the most common cause of primary hyperaldosteronism?

- ☐ Pituitary tumour
- ☐ Adrenocortical adenoma
- ☐ Adrenal carcinoma
- ☐ Ectopic secretion
- ☐ Bilateral idiopathic adrenal hyperplasia

Pituitary tumour

9%

Adrenocortical adenoma

35%

Adrenal carcinoma

4%

Ectopic secretion

3%

Bilateral idiopathic adrenal hyperplasia

49%

Bilateral idiopathic adrenal hyperplasia is the most common cause of primary hyperaldosteronism

Important for me [Less important](#)

A 60-year-old man who is known to have lung cancer comes for review. For the past three weeks he has lost his appetite, has been feeling sick and generally feels tired. On examination he appears to be mildly dehydrated. You order some blood tests:

Calcium	3.12 mmol/l
Albumin	40 g/l
Glucose (random)	6.7 mmol/l
Urea	10.2 mmol/l
Creatinine	115 µmol/l

Which one of his existing medications is most likely to be contributing to his presentation?

- ☐ Amlodipine
- ☐ Simvastatin
- ☐ Bendroflumethiazide
- ☐ Aspirin
- ☐ Lisinopril

Dr Assem

Amlodipine

5%

Simvastatin

3%

Bendroflumethiazide

85%

Aspirin

2%

Lisinopril

5%

Thiazides cause hypercalcaemia

Important for me

Less important

An 18-year-old male is reviewed due to concerns about delayed pubertal development, despite being 1.77m tall. On examination he has scant pubic hair and reduced testicular volume. The following blood results are obtained:

Testosterone	6.7 nmol/l (9 - 30)
LH	3 .1 mu/l (3 - 10)
FSH	5.7 mu/l (3 - 10)

What is the most likely diagnosis?

- ☐ Klinefelter's syndrome
- ☐ Acute lymphoblastic leukaemia
- ☐ Testicular feminisation syndrome
- ☐ Primary testicular failure
- ☐ Kallman's syndrome

Klinefelter's syndrome

47%

Acute lymphoblastic leukaemia

2%

Testicular feminisation syndrome

6%

Primary testicular failure

12%

Kallman's syndrome

33%

Klinefelter's - LH & FSH raised

Kallman's - LH & FSH low-normal

Important for me Less important

The LH and FSH levels are inappropriately low-normal given the low testosterone concentration, which points towards a diagnosis of hypogonadotrophic hypogonadism. In Klinefelter's syndrome the LH and FSH levels are raised

A 55-year-old woman is investigated following an osteoporotic hip fracture. The following results are obtained:

TSH	< 0.05 mu/l
Free T4	29 pmol/l

Which one of the following autoantibodies is most likely to be present?

- ☐ TSH receptor stimulating autoantibodies
- ☐ Anti-nuclear antibodies
- ☐ Anti-thyroglobulin autoantibodies
- ☐ Anti-microsomal antibodies
- ☐ Anti-thyroid peroxidase autoantibodies

TSH receptor stimulating autoantibodies

61%

Anti-nuclear antibodies

1%

Anti-thyroglobulin autoantibodies

10%

Anti-microsomal antibodies

2%

Anti-thyroid peroxidase autoantibodies

26%

TSH receptor stimulating autoantibodies (often referred to as Thyroid Stimulating Immunoglobulins) are almost diagnostic of Graves' disease, the most common cause of thyrotoxicosis in the UK

At which point in the menstrual cycle do progesterone levels peak?

- ☒ Luteal phase
- ☐ Ovulation
- ☐ Follicular phase
- ☐ Levels remain constant throughout cycle
- ☐ Menstruation



Progesterone is secreted by the corpus luteum following ovulation.

Which one of the following is not part of the diagnostic criteria for the metabolic syndrome?

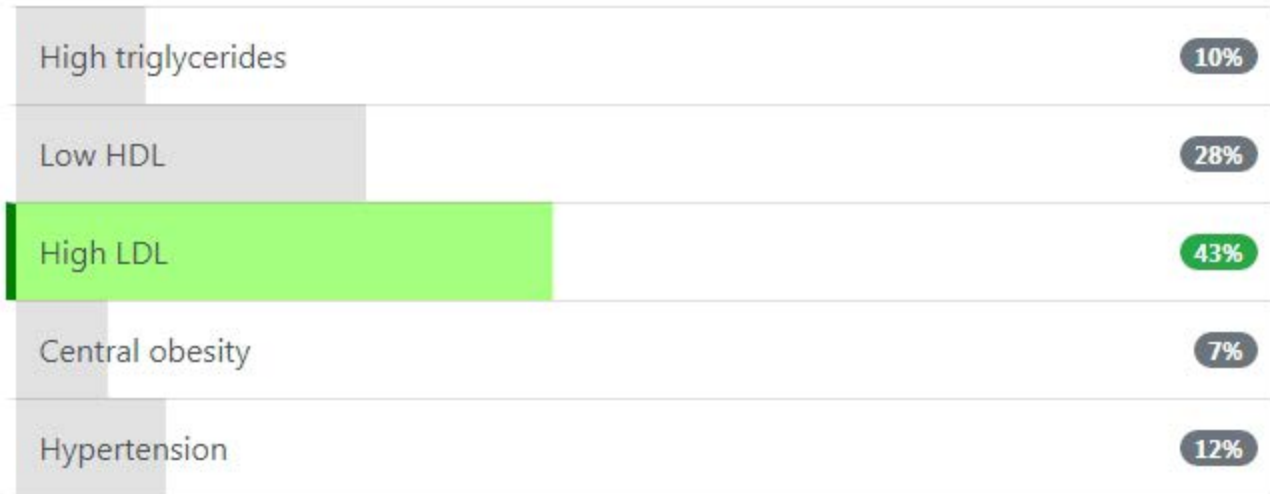
☐ High triglycerides

☐ Low HDL

☐ High LDL

☐ Central obesity

☐ Hypertension



High LDL levels are not part of the World Health Organization or International Diabetes Federation diagnostic criteria

A 25-year-old woman presents for her first cervical smear. What is the most important aetiological factor causing cervical cancer?

- ☐ Human papilloma virus 6 & 11
- ☐ Herpes simplex virus 2
- ☐ Smoking
- ☐ Combined oral contraceptive pill use
- ☐ Human papilloma virus 16 & 18

A 25-year-old woman presents for her first cervical smear. What is the most important aetiological factor causing cervical cancer?

Human papilloma virus 6 & 11

15%

Herpes simplex virus 2

2%

Smoking

4%

Combined oral contraceptive pill use

3%

Human papilloma virus 16 & 18

76%

Cervical cancer: Human papillomavirus infection (particularly 16,18 & 33) is by far the most important risk factor

Important for me Less important

Whilst a number of the above are known to contribute to the development of cervical cancer infection with human papilloma virus 16 & 18 is by far the most important factor.

A 43-year-old man presents to his GP with tiredness, low mood and unintentional weight gain of 13kg over the past 4 months. Prior to feeling like this he recalls having a flu-like illness following which he had a two-week period of feeling very anxious, shaky and energetic. He wonders if this is connected.

On examination he has a heart rate of 68 bpm, his blood pressure is 147/83 mmHg and his temperature is 37.1°C. Examination of his abdomen and chest are unremarkable and he does not have a goitre or any palpable lymphadenopathy. He has no family history of note and no past medical history.

Blood tests to look at his thyroid function show the following:

Thyroid stimulating hormone (TSH)	6.1 mu/l	(0.5-5.5 mu/l)
Free T4	6 pmol/l	(9-18 pmol/l)

What is the most likely cause of this man's symptoms?

- ☐ Grave's disease
- ☐ Hashimoto's thyroiditis
- ☐ Papillary cancer of the thyroid
- ☐ De Quervain's thyroiditis
- ☐ Toxic multinodular goitre

Submit answer

Dr Assem

Grave's disease

2%

Hashimoto's thyroiditis

35%

Papillary cancer of the thyroid

3%

De Quervain's thyroiditis

59%

Toxic multinodular goitre

1%

Subacute thyroiditis causes hyper- then hypothyroidism

Important for me Less important

This gentleman has a clinical picture of hypothyroidism with what appears to be a brief period of hyperthyroidism prior to this. The most common cause of this is De Quervain's thyroiditis and this would be in keeping with the history of a viral infection before the initial hyperthyroid episode. There is a rare form of Hashimoto's in which the patient has an initial phase of hyperthyroidism before becoming hypothyroid, however the period of hyperthyroidism is prolonged in those cases and the clinical picture is often indistinguishable from Grave's disease. In addition it happens far more commonly in women than men (around 5 times) and has a strong association with other auto-immune diseases. The key to this question is what is most likely and given the relatively brief period of hyperthyroidism (in Hashimoto's it would be in the order of 6-12 months rather than a few weeks) and the preceding viral infection, De Quervain's is far more likely.

Grave's disease and toxic multinodular goitre would both present with hyperthyroidism and papillary thyroid cancer does not produce thyroxine so would not cause any systemic symptoms.

Which one of the following statements regarding the normal menstrual cycle is **incorrect**?

- ☐ A number of follicles develop in the follicular phase under the influence of FSH
- ☐ The luteal phase is also known as the secretory phase
- ☐ The follicular phase follows menstruation and occurs around day 5 - 13
- ☐ A surge of FSH causes ovulation
- ☐ Progesterone levels are low in the follicular phase

A number of follicles develop in the follicular phase under the influence of FSH

6%

The luteal phase is also known as the secretory phase

9%

The follicular phase follows menstruation and occurs around day 5 - 13

11%

A surge of FSH causes ovulation

62%

Progesterone levels are low in the follicular phase

12%

LH surge causes ovulation

Important for me Less important

A 71-year-old woman with a history of type 2 diabetes mellitus presents with lethargy and polyuria. A diagnosis of hyperosmolar hyperglycaemic state is considered. Which one of the following findings would be least consistent with this diagnosis?

- ☐ pH of 7.38
- ☐ Ketones 1+ in urine
- ☐ Serum osmolality of 310 mosmol/kg
- ☐ Serum bicarbonate of 19 mmol/l
- ☐ Glucose of 45 mmol/l

pH of 7.38

9%

Ketones 1+ in urine

25%

Serum osmolality of 310 mosmol/kg

37%

Serum bicarbonate of 19 mmol/l

20%

Glucose of 45 mmol/l

9%

A trace of ketones may be found in hyperosmolar hyperglycaemic state. Serum osmolality is typically > 320 mosmol/kg

A 49-year-old woman with type 2 diabetes mellitus is being considered for exenatide therapy. Which one of the following is not part of the NICE criteria for starting or continuing this drug?

- ☐ BMI > 35 kg/m²
- ☐ Greater than 1.0 percentage point HbA1c reduction after 6 months
- ☐ Has failed with insulin therapy
- ☐ Has type 2 diabetes mellitus
- ☐ Weight loss > 3% at 6 months

BMI > 35 kg/m²

8%

Greater than 1.0 percentage point HbA1c reduction after 6 months

13%

Has failed with insulin therapy

57%

Has type 2 diabetes mellitus

6%

Weight loss > 3% at 6 months

16%

Patients do not need to have been on insulin prior to using exenatide

Dr Assef

Which one of the following is least characteristic of Addison's disease?

- ☐ Hypoglycaemia
- ☐ Metabolic alkalosis
- ☐ Hyponatraemia
- ☐ Hyperkalaemia
- ☐ Positive short ACTH test

Hypoglycaemia

8%

Metabolic alkalosis

56%

Hyponatraemia

6%

Hyperkalaemia

12%

Positive short ACTH test

18%

Addison's disease is associated with a metabolic acidosis

Important for me

Less important

A 23-year-old woman is admitted to the intensive care unit following an episode of diabetic ketoacidosis. On admission her Glasgow coma scale was 7/15. Collateral history revealed long-standing type 1 diabetes mellitus with poor glycaemic control.

Arterial blood gases:

pH	7.12
paCO ₂	3.1 kPa
paO ₂	12.2 kPa
HCO ₃	3 mmol/l

Capillary Glucose: 33mmol/L

Urine dip:

glucose	+++
ketones	+++
protein	-
nitrites	-
Leucocyte esterase	-

The patient was intubated and successfully treated with intravenous fluids, insulin and venous thromboembolism prophylaxis.

On discharge her GP undertook a routine screen of blood tests.

Which of the following thyroid function tests results would be in keeping with her presentation?

- ☐ TSH - high, T4 - Low, T3 high
- ☐ TSH - high, T4 - normal, T3 normal
- ☐ TSH - low, T4 - Low, T3 high
- ☐ TSH - low, T4 - normal, T3 normal
- ☐ TSH - normal, T4 - Low, T3 low

TSH - high, T4 - Low, T3 high	8%
TSH - high, T4 - normal, T3 normal	13%
TSH - low, T4 - Low, T3 high	11%
TSH - low, T4 - normal, T3 normal	13%
TSH - normal, T4 - Low, T3 low	54%

Sick euthyroid syndrome is a reversible state of abnormal thyroid function tests due to a non-thyroidal illness, without pre-existing hypothalamic-pituitary or thyroid gland dysfunction. By definition, after recovery of the non-thyroidal illness, thyroid function tests should revert back to normal.

Causes of sick euthyroid include: myocardial infarctions, starvation, burns, trauma, surgery, malignancy, diabetic ketoacidosis, any organ failure and inflammatory conditions.

The pathology postulated is the down regulation of type 1 deiodinase, reducing the peripheral conversion of T4 to T3 and thus reducing the basal metabolic rate during periods of stress. Upregulation of type 3 deiodinase to inactive (reverse) T3 also aids to reducing basal metabolic rate.

A patient with type 2 diabetes is reviewed in clinic. He is currently taking metformin but his diabetes control remains poor. As he has an erratic lifestyle consideration is given to starting repaglinide. What is the mechanism of action of this drug?

- ☐ Dipeptidyl peptidase-4 (DPP-4) inhibitor
- ☐ Agonist to the PPAR-gamma receptor
- ☐ Alpha-glucosidase inhibitor
- ☐ Glucagon-like peptide-1 (GLP-1) mimetic
- ☐ Activates an ATP-dependent K^+ channel on the cell membrane of pancreatic beta cells

Dipeptidyl peptidase-4 (DPP-4) inhibitor

14%

Agonist to the PPAR-gamma receptor

13%

Alpha-glucosidase inhibitor

8%

Glucagon-like peptide-1 (GLP-1) mimetic

21%

Activates an ATP-dependent K^{+} channel on the cell membrane of pancreatic beta cells

44%

You are called to see a 34 year-old man in the late afternoon while you are on-call. He suffers with type 1 diabetes mellitus and was admitted after being diagnosed with diabetic ketoacidosis. He has been treated with a fixed-rate insulin infusion with potassium replacement. He usually takes Lantus glargine and Novorapid insulins, but the nurses have not been administering these while he has been on his insulin infusion. His latest arterial blood gas is shown:

pH	7.37
pCO ₂	4.3 kPa
pO ₂	11.9 kPa
BIcarbonate	26 mmol/L
Glucose	5.2 mmol/L

What is the best course of action?

- ☐ Stop insulin infusion now and restart normal insulin regimen
- ☐ Give Novorapid insulin, then stop insulin infusion with next meal
- ☐ Continue insulin infusion overnight
- ☐ Give 10g oral glucose
- ☐ Give Lantus glargine, then stop insulin infusion with next meal

Stop insulin infusion now and restart normal insulin regimen	17%
Give Novorapid insulin, then stop insulin infusion with next meal	15%
Continue insulin infusion overnight	8%
Give 10g oral glucose	8%
Give Lantus glargine, then stop insulin infusion with next meal	52%

Stopping an insulin infusion in the context of an insulin-dependent diabetic needs to be done with care. Long-acting insulins should be continued throughout the duration of any insulin infusion, but in this case this has not occurred - a not-uncommon problem on the wards.

The key focus here is that an insulin-dependent diabetic should never be without insulin as they risk precipitating diabetic ketoacidosis (DKA). Option A will leave a gap in insulin therapy (the patient's next insulin dose will be novorapid due with dinner) and risk recurrence of DKA. Option B gives only a short acting insulin, which will have worn off by the time the patient has his next meal. Option C is a safe choice, but this patient no longer requires an insulin infusion as evidenced by his normalised pH and blood glucose and continuing the infusion (with the attendant hourly blood glucose checking) overnight is not in the patient's best interests. Option D is inappropriate as the patient's blood glucose is in the normal range. Option E is therefore the correct option - it allows the patient's long-acting insulin to take effect before stopping the insulin infusion. He should also restart his Novorapid insulin with his next meal.

Which one of the following statements regarding glucagon-like peptide-1 (GLP-1) is **incorrect**?

- ☐ Secreted in response to an oral glucose load
- ☐ Increased levels are seen in type 2 diabetes mellitus
- ☐ Slows gastric emptying
- ☐ Secreted by the small intestine
- ☐ Responsible for the incretin effect

Secreted in response to an oral glucose load

9%

Increased levels are seen in type 2 diabetes mellitus

54%

Slows gastric emptying

16%

Secreted by the small intestine

11%

Responsible for the incretin effect

10%

Decreased levels of GLP-1 are seen in type 2 diabetes mellitus

Dr Assem

A 54-year-old woman presents to the Emergency Department with confusion and fever. She has a past history of thyrotoxicosis previously treated with radioiodine therapy. On examination she has a pulse of 120/min regular, blood pressure 150/90 mmHg, temperature of 39.1°C and a respiratory rate of 18/min. Examination of the cardiorespiratory system is unremarkable and urine dipstick is clear. Blood results showed the following:

Free T4	84 pmol/l (normal range 10-22 pmol/l)
Free T3	29 pmol/l (2.5-5.5 pmol/l)
TSH	< 0.01 mU/l (0.5-4.0 mU/l)

Which one of the following does not have a role in the subsequent management?

- ☐ Lugol's iodine
- ☐ Propranolol
- ☐ Propylthiouracil
- ☐ Bicarbonate
- ☐ Dexamethasone

Lugol's iodine

15%

Propranolol

5%

Propylthiouracil

8%

Bicarbonate

62%

Dexamethasone

11%

There is no indication for giving bicarbonate in this scenario.

Dr Assem

A 59-year-old woman comes to the diabetes clinic for review. Current medication includes metformin and sitagliptin, but her HbA1c has continued to rise and additional therapy is required. Her body mass index is 35 kg/m². Blood pressure is 132/82 mmHg, her pulse is 74 beats per minute and regular. A decision is made to start her on degludec liraglutide combination therapy.

Which of the following should you warn her about?

- ☐ Patients often get skin nodules around the injection site
- ☐ Pancreatitis is commonly associated with treatment
- ☐ Risk of hypoglycaemia will increase when she starts treatment
- ☐ She will lose approximately 5kg in weight when she starts treatment
- ☐ She will gain approximately 6kg in the first year of treatment

Patients often get skin nodules around the injection site	10%
Pancreatitis is commonly associated with treatment	34%
Risk of hypoglycaemia will increase when she starts treatment	32%
She will lose approximately 5kg in weight when she starts treatment	18%
She will gain approximately 6kg in the first year of treatment	6%

insulin and GLP-1 fixed dose combinations are increasingly attractive as a treatment option for diabetologists because they combine the potent glucose-lowering effect of GLP-1 agonists and long-acting insulin analogues in one preparation. They are however associated with increased risk of hypoglycaemia, Rates of confirmed hypoglycaemia (<3.1 mmol/l), run at between 1.8 and 3.5 per patient year of exposure.

Skin nodules are most often seen around injection sites when modified release systems are used for delivering GLP-1, such as those used in weekly exenatide, (microspheres). Pancreatitis features in case reports associated with the use of GLP-1 agonists, although no consistent link has been established. Modest weight loss is seen when patients start degludec / liraglutide against a background of oral agents, but this is less than that seen for patients who start liraglutide alone.

<https://www.evidence.nhs.uk/formulary/bnf/current/6-endocrine-system/61-drugs-used-in-diabetes/612-antidiabetic-drugs/6123-other-antidiabetic-drugs>

A 58-year-old woman presents to the emergency department with confusion. She is found to have a raised temperature, tachycardia and is hypotensive. After further investigation, she is found to be in a thyrotoxic storm.

Given her presentation what is the best first line treatment?

- ☐ Adrenaline and hydrocortisone
- ☐ Beta blockers and propylthiouracil
- ☐ Adrenaline, propylthiouracil and hydrocortisone
- ☐ Beta blockers, propylthiouracil and hydrocortisone
- ☐ Propylthiouracil and hydrocortisone

Adrenaline and hydrocortisone	4%
Beta blockers and propylthiouracil	13%
Adrenaline, propylthiouracil and hydrocortisone	6%
Beta blockers, propylthiouracil and hydrocortisone	61%
Propylthiouracil and hydrocortisone	16%

Thyrotoxic storm is treated with beta blockers, propylthiouracil and hydrocortisone

Important for me Less important

This question is asking about a woman presenting with confusion, tachycardia, hypotension and a raised temperature who is found to be in a thyrotoxic storm (also known as a hyperthyroid crisis). You are asked for the best first-line treatment in this case which is option 4, beta blockers, propylthiouracil and hydrocortisone.

Beta blockers are used to treat the tachycardia, however, these as always would be contraindicated in patients suffering from asthma.

Propylthiouracil is used as an anti-thyroid treatment to help reduce the effect of raised serum thyroid hormones that are causing her symptoms.

Hydrocortisone is used to treat any underlying adrenal insufficiency which is more common in patients suffering from hyperthyroidism and can also help to reduce serum thyroid hormone levels.

You are reviewing a 24-year-old man who has recently been diagnosed with type 1 diabetes mellitus. He has no comorbidities and works as an accountant. What HbA1c target should he aim for initially?

- ☐ 42 mmol/mol
- ☐ 45 mmol/mol
- ☐ 48 mmol/mol
- ☐ 50 mmol/mol
- ☐ 52 mmol/mol

42 mmol/mol

12%

45 mmol/mol

13%

48 mmol/mol

57%

50 mmol/mol

8%

52 mmol/mol

9%

In type 1 diabetics, a general HbA1c target of 48 mmol/mol (6.5%) should be used

Important for me Less important

Which one of the following features is least commonly seen in Gitelman's syndrome?

- ☐ Hypokalaemia
- ☐ Hypertension
- ☐ Metabolic alkalosis
- ☐ Hypocalciuria
- ☐ Hypomagnesaemia

Hypokalaemia

8%

Hypertension

54%

Metabolic alkalosis

10%

Hypocalciuria

18%

Hypomagnesaemia

9%

Gitelman's syndrome: normotension with hypokalaemia

Important for me Less important

A 20-year-old man presents with a nine month history of weight gain. Prior to this he was of a normal weight and cannot identify any obvious lifestyle changes that would account for his obesity. On examination he is noted to have abdominal striae and a degree of proximal myopathy. Blood pressure is 130/80 mmHg. Bloods show the following:

Na ⁺	141 mmol/l
K ⁺	3.3 mmol/l
Bicarbonate	26 mmol/l
Urea	3.3 mmol/l
Creatinine	72 μ mol/l

What is the most appropriate next test?

- ☐ High-dose dexamethasone suppression test
- ☐ Plasma ACTH
- ☐ Short ACTH test
- ☐ 24 hour urinary free cortisol
- ☐ Renin:aldosterone ratio

High-dose dexamethasone suppression test	26%
Plasma ACTH	5%
Short ACTH test	11%
24 hour urinary free cortisol	53%
Renin:aldosterone ratio	5%

The overnight dexamethasone suppression test is the best test to diagnosis Cushing's syndrome

Important for me Less important

There is some debate as to whether a 24 hour urinary free cortisol or an overnight dexamethasone suppression test should be used to screen patients for Cushing's. The overnight (not high-dose) dexamethasone suppression test has however been shown to be more sensitive and is now much more commonly used in clinical practice. As this is not offered then 24 hour urinary free cortisol is the next best answer

For a review comparing diagnostic methods see 'Specificity of first-line tests for the diagnosis of Cushing's syndrome: assessment in a large series, J Clin Endocrinol Metab. 2007 Nov;92(11):4123-9'

The high-dose dexamethasone suppression test is used to help differentiate the cause of Cushing's syndrome

A 36-year-old man presents to a genitourinary clinic with multiple keratinized genital warts. You commence treatment with cryotherapy and in the ensuing conversation about HPV, he asks you about whether there are any preventive measures that could have stopped him from contracting the virus.

Which of the following individuals is it most appropriate to offer the HPV (Gardasil) vaccination?

- ☐ A 34-year-old man who has sex with women
- ☐ A 24-year-old heterosexual male who has never had sex
- ☐ A 35-year-old sexually active female with abnormal smears
- ☐ A 21-year-old bisexual man who currently has 3 regular sexual partners
- ☐ A 22-year-old transgender man who was previously vaccinated as a teenager

A 34-year-old man who has sex with women

6%

A 24-year-old heterosexual male who has never had sex

22%

A 35-year-old sexually active female with abnormal smears

19%

A 21-year-old bisexual man who currently has 3 regular sexual partners

46%

A 22-year-old transgender man who was previously vaccinated as a teenager

7%

HPV vaccination should be offered to men who have sex with men under the age of 45 to protect against anal, throat and penile cancers

Important for me Less important

HPV vaccination is currently recommended to men who have sex with men under 45-year-old to reduce their risk of anal, throat and penile cancers as well as genital warts. It is also recommended for girls, usually age 12-13, prior to their first sexual exposure; there is currently no catch-up vaccination programme for women who were not offered the vaccine at that age.

Transgender men (who were assigned female at birth) who have sex with men are also eligible (although do not require it if previously vaccinated). From 2019, 12 and 13 year old boys will also be offered vaccination; PHE does not currently suggest a catch up program for heterosexual men.

Which one of the following is the most common non-iatrogenic cause of Cushing's syndrome?

- ☐ Ectopic ACTH production
- ☐ Adrenal adenoma
- ☐ Micronodular adrenal dysplasia
- ☐ Adrenal carcinoma
- ☐ Pituitary tumour

Ectopic ACTH production

18%

Adrenal adenoma

37%

Micronodular adrenal dysplasia

6%

Adrenal carcinoma

3%

Pituitary tumour

35%

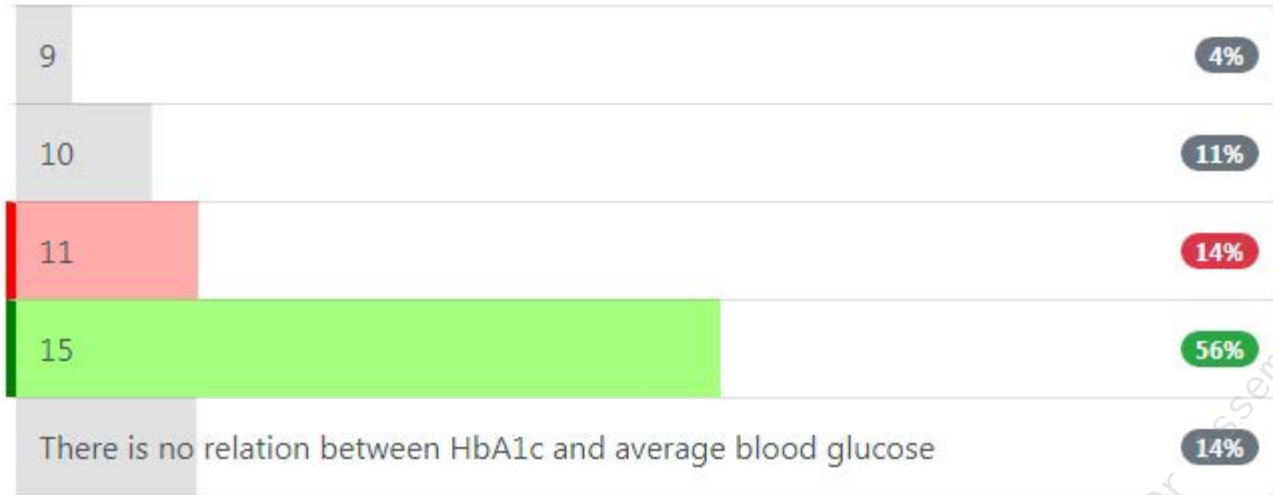
Cushing's disease is the most common, non-iatrogenic, cause of Cushing's syndrome

A 55-year-old female is reviewed in the diabetes clinic. The following results are obtained:

Urinalysis	protein +
HbA1c	86 mmol/mol (10.0%)

What average blood glucose level for the past 2 months is this most likely to represent?

- ☐ 9
- ☐ 10
- ☐ 11
- ☐ 15
- ☐ There is no relation between HbA1c and average blood glucose



A 25-year-old male develops type 2 diabetes mellitus. Which one of the following genes is most likely to be responsible?

☐ Glucokinase

☐ HNF-1 alpha

☐ HNF-4 alpha

☐ HNF-1 beta

☐ IPF-1

Glucokinase

11%

HNF-1 alpha

47%

HNF-4 alpha

21%

HNF-1 beta

14%

IPF-1

8%

A patient with type 2 diabetes mellitus is started on sitagliptin. What is the mechanism of action of sitagliptin?

- ☐ Incretin inhibitor
- ☐ Dipeptidyl peptidase-4 (DPP-4) inhibitor
- ☐ Alpha-glucosidase inhibitor
- ☐ Glucagon inhibitor
- ☐ Glucagon-like peptide-1 (GLP-1) mimetic

Incretin inhibitor

2%

Dipeptidyl peptidase-4 (DPP-4) inhibitor

83%

Alpha-glucosidase inhibitor

2%

Glucagon inhibitor

2%

Glucagon-like peptide-1 (GLP-1) mimetic

10%

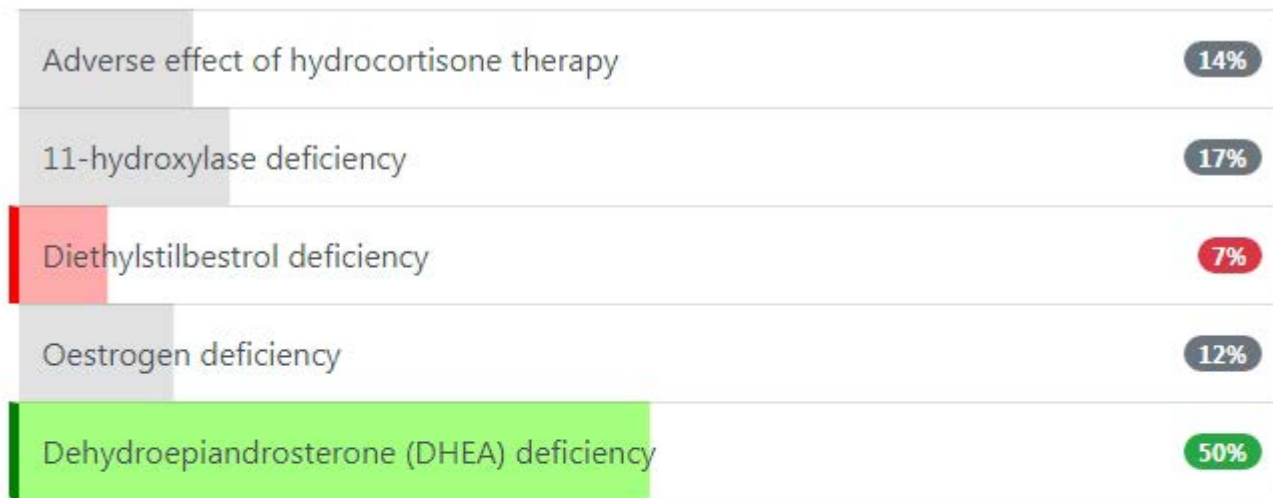
Gliptins = Dipeptidyl peptidase-4 (DPP-4) inhibitors

Important for me

Less important

A 34-year-old female with a history of Addison's disease presents for review in endocrinology clinic. She is generally well but complains of a decrease in her libido. On examination there is a slight loss of pubic hair. What is the most likely cause?

- ☐ Adverse effect of hydrocortisone therapy
- ☐ 11-hydroxylase deficiency
- ☐ Diethylstilbestrol deficiency
- ☐ Oestrogen deficiency
- ☐ Dehydroepiandrosterone (DHEA) deficiency



Dehydroepiandrosterone is the most abundant circulating adrenal steroid. Adrenal glands are the main source of dehydroepiandrosterone in females - loss of functioning adrenal tissue as in Addison's disease may result in symptoms secondary to androgen deficiency, such as loss of libido. Research is ongoing as to whether routine replacement of DHEA is beneficial

Which one of the following statements regarding impaired glucose regulation is correct?

- ☐ All patient should have a repeat oral glucose tolerance test every 2 years
- ☐ Patients with impaired glucose tolerance are more likely to develop diabetes than patients with impaired fasting glycaemia
- ☐ Impaired glucose tolerance (IGT) is defined as a fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l
- ☐ Around 1 in 20 adults in the UK have impaired glucose regulation
- ☐ Patients should be offered pioglitazone if lifestyle changes fail to improve their glucose profile

All patient should have a repeat oral glucose tolerance test every 2 years

5%

Patients with impaired glucose tolerance are more likely to develop diabetes than patients with impaired fasting glycaemia

56%

Impaired glucose tolerance (IGT) is defined as a fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l

22%

Around 1 in 20 adults in the UK have impaired glucose regulation

13%

Patients should be offered pioglitazone if lifestyle changes fail to improve their glucose profile

4%

A 68-year-old woman is found to have the following blood tests:

TSH	0.05 mu/l
Free T4	19 pmol/l (range 9-25 pmol/l)
Free T3	7 pmol/l (range 3-9 pmol/l)

If left untreated, what are the most likely possible consequences?

- ☐ Supraventricular arrhythmias and osteoporosis
- ☐ Supraventricular arrhythmias and hyperlipidaemia
- ☐ Hypothyroidism and impaired glucose tolerance
- ☐ Myasthenia gravis and hypothyroidism
- ☐ Impaired glucose tolerance and hyperlipidaemia

Supraventricular arrhythmias and osteoporosis

57%

Supraventricular arrhythmias and hyperlipidaemia

11%

Hypothyroidism and impaired glucose tolerance

18%

Myasthenia gravis and hypothyroidism

4%

Impaired glucose tolerance and hyperlipidaemia

10%

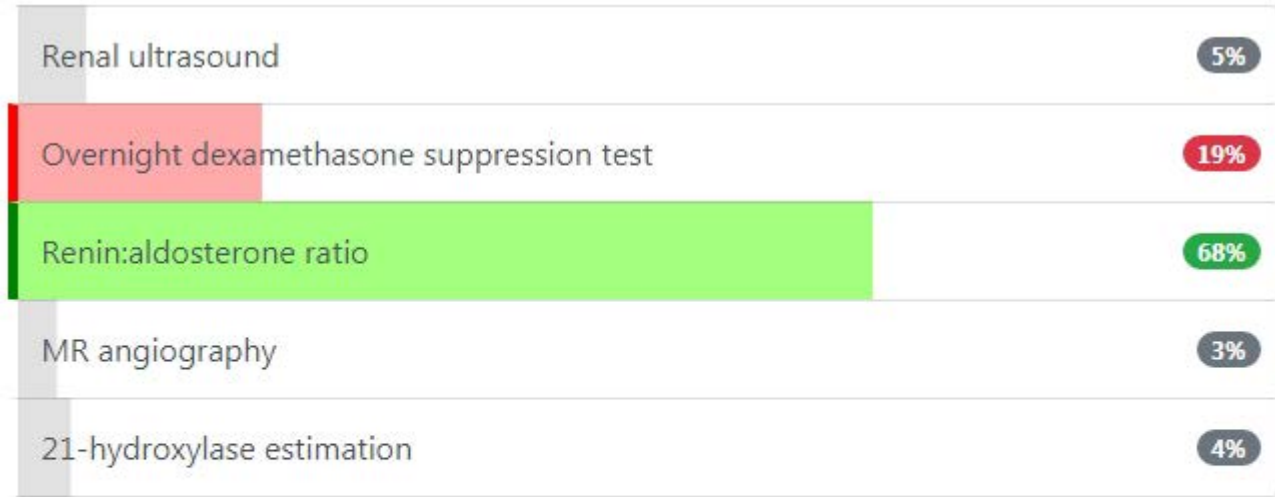
A 24-year-old woman is found to have a blood pressure of 170/100 mmHg during a routine medical check. She is well and clinical examination is unremarkable. Blood tests show:

Na ⁺	140 mmol/l
K ⁺	2.6 mmol/l
Bicarbonate	31 mmol/l
Urea	3.4 mmol/l
Creatinine	77 µmol/l

Which one of the following investigations is most likely to be diagnostic?

- ☐ Renal ultrasound
- ☐ Overnight dexamethasone suppression test
- ☐ Renin:aldosterone ratio
- ☐ MR angiography
- ☐ 21-hydroxylase estimation

Dr Assem



Conn's syndrome is the likely diagnosis - a renin:aldosterone ratio would be an appropriate first-line investigation. A normal clinical examination makes a diagnosis of Cushing's syndrome less likely

Liddle's syndrome is associated with each one of the following, except:

- ☐ Alkalosis
- ☐ Response to treatment with amiloride
- ☐ Hypertension
- ☐ Autosomal recessive inheritance
- ☐ Hypokalaemia

Alkalosis

12%

Response to treatment with amiloride

18%

Hypertension

18%

Autosomal recessive inheritance

42%

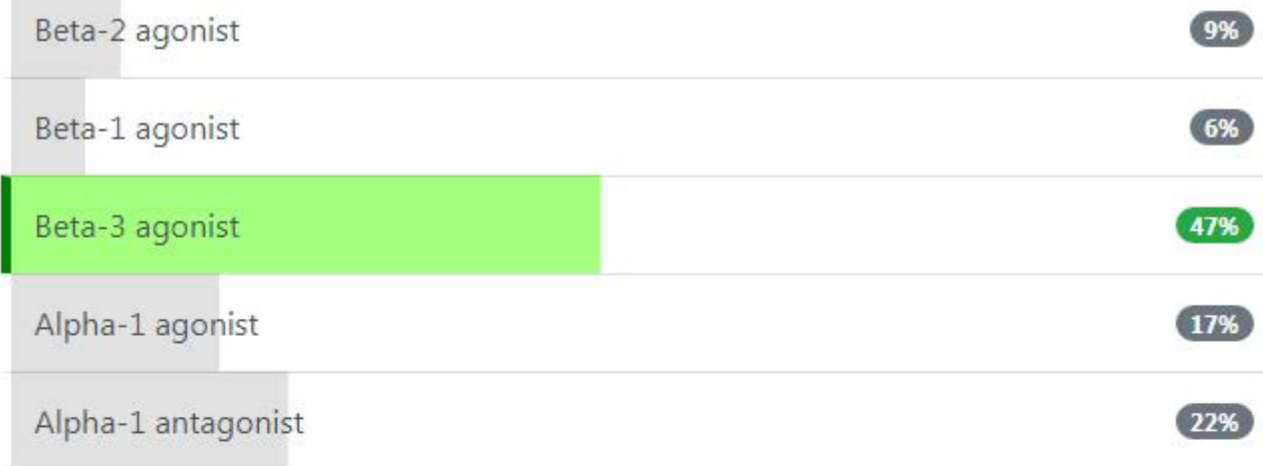
Hypokalaemia

9%

A 73-year-old man is seen in incontinence clinic by a speciality doctor. He has a past medical history of urge incontinence. He has tried oxybutynin in the past but did not find it helpful. He didn't tolerate tolterodine either due to his longstanding constipation. The doctor prescribes a 6- week course of mirabegron.

What is the mechanism of action of mirabegron?

- ☐ Beta-2 agonist
- ☐ Beta-1 agonist
- ☐ Beta-3 agonist
- ☐ Alpha-1 agonist
- ☐ Alpha-1 antagonist



Mirabegron is a beta-3 agonist

Important for me Less important

Mirabegron is a beta-3 agonist used in the management of urge incontinence if the other drugs such as oxybutynin fail to work or are contraindicated.

Salbutamol is a beta-2 receptor agonist and causes bronchial smooth muscle relaxation. Beta-2 receptors are predominantly found in the lungs.

Beta-1 agonists, such as dobutamine, are used as inotropic agents in congestive heart failure.

Doxazosin is an alpha-1 antagonist, used in the management of hypertension.

Phenylephrine is an alpha-1 agonist. It acts as a vasoconstrictor and is used as a nasal decongestant.

An elderly male with T2DM was taken to the Emergency Department with confusion, sweating, and ataxia. He is prescribed thiamine, metformin, gliclazide, and atorvastatin. BM was measured as 1.3 mmol/L with paramedics and, after administration of 100ml IV dextrose 20%, returned to 5.4 mmol/L.

You are called to see the patient in the acute medical unit as his BM has dropped to 1.8 mmol/L.

What is the most likely underlying cause?

- ☐ Low glycogen stores secondary to chronic alcoholism
- ☐ Metformin associated lactic acidosis
- ☐ Starvation
- ☐ Sulfonylurea-induced hypoglycaemia
- ☐ Wernicke's encephalopathy

Low glycogen stores secondary to chronic alcoholism

23%

Metformin associated lactic acidosis

5%

Starvation

6%

Sulfonylurea-induced hypoglycaemia

55%

Wernicke's encephalopathy

12%

In sulphonylurea overdoses, patients are at risk of recurrent hypoglycaemia

Important for me Less important

Sulphonylureas are long-acting anti-glycaemic agents with the potential to cause recurrent hypoglycaemia.

Glycogen stores are low in chronic alcoholism preventing the use of glucagon as an effective treatment for hypoglycaemia. Wernicke's encephalopathy may be precipitated by administration of glucose before thiamine.

A 45-year-old woman who has a history of Graves' disease presents with visual problems. She is known to have Graves' ophthalmopathy and does not currently smoke. Her most recent thyroid function tests are shown below:

Free T4	15 pmol/l
TSH	1.6 mu/l

Which one of the following features is the strongest indicator of the need for urgent ophthalmology review?

- ☐ Sensitivity of eyes to light
- ☐ Diplopia
- ☐ Troublesome eyelid retraction
- ☐ Awareness of change in intensity or quality of colour vision
- ☐ Erythema of the conjunctiva

Sensitivity of eyes to light

4%

Diplopia

22%

Troublesome eyelid retraction

13%

Awareness of change in intensity or quality of colour vision

55%

Erythema of the conjunctiva

6%

The other symptoms/signs indicate the need for non-urgent review by an ophthalmologist.
Please see the EUGOGO guidelines for more details.

Which one of the following is not associated with primary hyperparathyroidism?

- ☐ Hypotension
- ☐ Multiple endocrine neoplasia type 1
- ☐ Multiple endocrine neoplasia type 2a
- ☐ Depression
- ☐ Pancreatitis

Condition	Percentage
Hypotension	64%
Multiple endocrine neoplasia type 1	8%
Multiple endocrine neoplasia type 2a	16%
Depression	6%
Pancreatitis	7%

64%

Multiple endocrine neoplasia type 1

8%

Multiple endocrine neoplasia type 2a

16%

Depression

6%

Pancreatitis

7%

Primary hyperparathyroidism is associated with hypertension

Dr Assem

Dynamic pituitary function tests may be used to assess each one of the following, except:

- ☐ Cortisol
- ☐ Prolactin
- ☐ Growth hormone
- ☐ Follicular stimulating hormone
- ☐ Antidiuretic hormone

Cortisol

20%

Prolactin

16%

Growth hormone

7%

Follicular stimulating hormone

8%

Antidiuretic hormone

48%

Dr. Arsem

A 68-year-old woman presents with lethargy and generalised aches. As part of a blood screen the following results are obtained:

Calcium	2.83 mmol/l
Albumin	42 g/l
ESR	26 mm/hr

What is the most likely cause of these blood results?

- ☐ Multiple myeloma
- ☐ Sarcoidosis
- ☐ Normal
- ☐ Breast cancer metastases
- ☐ Primary hyperparathyroidism



Malignancy and primary hyperparathyroidism account for 90% of hypercalcaemia cases

Important for me [Less important](#)

This question tests whether you have an understanding of the incidence of common disorders. All of the above may cause hypercalcaemia but cancer and primary hyperparathyroidism are the most common causes in this age group. A normal ESR (given her age) points towards a diagnosis of primary hyperparathyroidism.

A 53-year-old man with a history of type 2 diabetes mellitus is reviewed in the diabetes clinic. Twelve months ago his HbA1c was 9.7% despite maximal oral hypoglycaemic therapy. Insulin was started and his most recent HbA1c is 8.2%. He is considering applying for a HGV licence and asks for advice. What is the most appropriate advice?

- He cannot drive a heavy goods vehicle if he is taking insulin
- He may be able to apply for a HGV licence if he meets strict criteria relating to hypoglycaemia
- He should stop insulin and start meglitinide
- As under 55 years of age there is no requirement to inform the DVLA
- He needs to have been stable on insulin for at least 5 years before applying

He cannot drive a heavy goods vehicle if he is taking insulin

20%

He may be able to apply for a HGV licence if he meets strict criteria relating to hypoglycaemia

60%

He should stop insulin and start meglitinide

5%

As under 55 years of age there is no requirement to inform the DVLA

7%

He needs to have been stable on insulin for at least 5 years before applying

8%

Patients on insulin may now hold a HGV licence if they meet strict DVLA criteria

Important for me Less important

A 53-year-old male presents to the Emergency Department complaining of extreme fatigue. He has a background of treated Graves disease. On examination his blood pressure is 103/58 mmHg, pulse 64/min and temperature 36.3°C. The following results are obtained:

Na+	135 mmol/l
K+	5.4 mmol/l
Urea	5.2 mmol/l
Creatinine	42 μ mol/l
TSH	3.5 mu/l
Free thyroxine (T4)	12 pmol/l

You arrange for a random cortisol test however whilst awaiting the result he becomes unresponsive. In addition to giving intravenous steroid and fluid, what test is it imperative to check first given the likely diagnosis?

☐ Serum calcium

☐ ECG

☐ Arterial pH

☐ Prolactin

☐ Glucose

Serum calcium	8%
ECG	15%
Arterial pH	9%
Prolactin	5%
Glucose	63%

This question is alluding to a diagnosis of Addison's disease. The autoimmune history, raised potassium, fatigue and low blood pressure are all clues to this.

Patients with Addison's disease are prone to developing hypoglycaemia due to loss of the glucogenic effect of glucocorticoids. Given the sudden deterioration in GCS, a glucose level must be checked.

Addison's disease:
 Addison's is adrenocortical insufficiency due to the dysfunction/destruction of the adrenal cortex. It affects both glucocorticoid (metabolism of glucose etc.) and mineralocorticoid (salt balance) function. The commonest cause in the developed world is autoimmune adrenalitis. Other causes include destruction of the cortex by infections such as TB, or metastasis.

Signs/symptoms of Addisonian crisis:

- Neurological
- syncope
 - confusion
 - lethargy
 - convulsions

- Haemodynamic
- hypotension
 - hypothermia

- Biochemical
- hyponatraemia
 - hyperkalaemia
 - hypoglycaemia

- Management of Addisonian crisis (medical emergency):**
- intravenous fluids
 - corticosteroids (e.g iv dexamethasone)

Note: iv dexamethasone is often preferred as this will not interfere with cortisol assays needed for a short synacthen test, unlike hydrocortisone.

Dr Assem

An 81-year old female is admitted with a 6-week history dysphagia to both solids and liquids. She describes odynophagia, weight loss and night sweats.

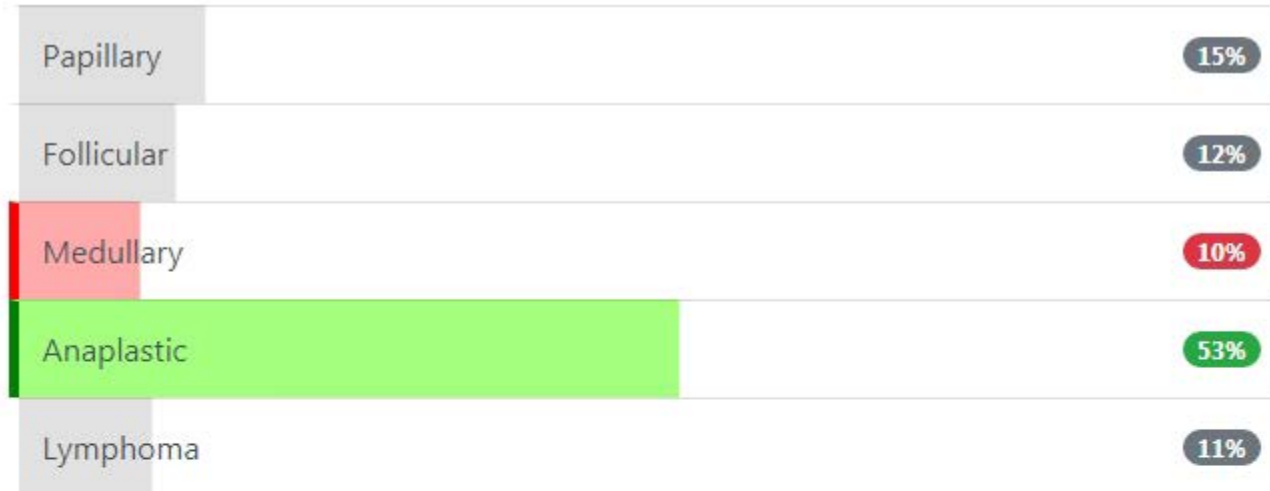
On examination there was firm irregular mass in the right side of the anterior triangle of the neck. It was fixed, cold and painless. The mass moved with swallowing and you note a faint stridor like sound on inspiration. There was a further 3 irregular lymph nodes of note on palpation.

Bloods:

Thyroid stimulating hormone	4.5 mu/l
Free T4	12 pmol/l
Total T4	99 nmol/l

An ultrasound-guided biopsy is likely to reveal which histological tumour?

- ☐ Papillary
- ☐ Follicular
- ☐ Medullary
- ☐ Anaplastic
- ☐ Lymphoma



Anaplastic thyroid cancer is a highly aggressive, locally invasive tumour. It typically presents in older patients with a rapidly increasing mass or lymph node. Anaplastic tumours invade local surrounding tissues causing compression symptoms including: pain, shortness of breath and dysphagia. The aggression of the tumour often leads to lymphovascular invasion and subsequent bone and lung metastasis. The cancer originates from follicular cells, which are poorly differentiated and have a high mitotic rate. The prognosis is poor with a 5-year survival rate quoted between 7% and 14%. Treatment is usually palliative, with a combination of radiotherapy and chemotherapy.

A 33-year-old man with tingling in his thumb, index and middle finger has been referred for endocrine consultation. He also complains of waking up incredibly tired and says his wife complains that he snores. On examination, he is noted to have a prominent brow ridge. Looking at old photos, it becomes clear that his facial appearance has drastically changed over time. After some blood tests and an MRI scan, he is prescribed octreotide. What is the mechanism of action of this drug?

- ☐ Somatostatin analogue
- ☐ Growth hormone receptor antagonist
- ☐ Dopamine agonist
- ☐ Dopamine antagonist
- ☐ Insulin-growth factor 1 antagonist

Somatostatin analogue	74%
Growth hormone receptor antagonist	12%
Dopamine agonist	4%
Dopamine antagonist	4%
Insulin-growth factor 1 antagonist	6%

Acromegaly is caused by excessive growth hormone. Somatostatin directly inhibits the release of growth hormone, and hence somatostatin analogues are used to treat acromegaly

Important for me Less important

This question is two-fold. First, one has to recognise the symptoms of acromegaly. Carpal tunnel syndrome and sleep apnoea are classic complications of acromegaly. The changing nature of his face over time is another clue. The second part of the question was to acknowledge that octreotide, a useful treatment for acromegaly is a somatostatin analogue.

Dopamine agonists were initially used to treat acromegaly but have fallen out of favour due to superior treatments. Dopamine antagonists have never been a treatment for acromegaly. An example of a growth hormone antagonist is pegvisomant. Growth hormone stimulates insulin growth factor-1 release from the liver, but antagonists have not been developed yet.

A 41-year-old man presents with recurrent headaches. These typically occur 2-3 times a day and are associated with sweating and palpitations. As he was concerned that it may be due to blood pressure he borrowed his father's home monitor. During these episodes his blood pressure is around 210/110 mmHg. Given the likely diagnosis, what is the most appropriate next test?

- ☐ MRI adrenals
- ☐ Phenoxybenzamine suppression test
- ☐ 24 hour urinary collection of vanillylmandelic acid
- ☐ 24 hour urinary collection of metanephrines
- ☐ 24 hour urinary collection of catecholamines

MRI adrenals

4%

Phenoxybenzamine suppression test

4%

24 hour urinary collection of vanillylmandelic acid

11%

24 hour urinary collection of metanephrines

55%

24 hour urinary collection of catecholamines

26%

Phaeochromocytoma: do 24 hr urinary metanephrines, not catecholamines

Important for me Less important

Three 24 hour collections are needed as some patients have intermittently raised levels.

Each one of the following is associated with pseudohypoparathyroidism, except:

- ☐ Low calcium levels
- ☐ Low PTH levels
- ☐ Shortened 4th and 5th metacarpals
- ☐ Low IQ
- ☐ Short stature

Low calcium levels

18%

Low PTH levels

52%

Shortened 4th and 5th metacarpals

11%

Low IQ

12%

Short stature

7%

A 34-year-old woman presents with palpitations, tremor and heat intolerance. She is diagnosed with Graves' disease and started on carbimazole. What is the mechanism of action of this drug?

- ☐ Inhibits 5'-deiodinase reducing production of T3
- ☐ Increases renal excretion of carbimazole
- ☐ Blocks uptake of iodine to thyroid gland by reducing levels of hydrogen peroxide
- ☐ Blocks thyroid peroxidase from coupling and iodinating the tyrosine residues on thyroglobulin
- ☐ Increases rate of thyroxine breakdown by thyroid peroxidase

Inhibits 5'-deiodinase reducing production of T3

12%

Increases renal excretion of carbimazole

1%

Blocks uptake of iodine to thyroid gland by reducing levels of hydrogen peroxide

13%

Blocks thyroid peroxidase from coupling and iodinating the tyrosine residues on thyroglobulin

70%

Increases rate of thyroxine breakdown by thyroid peroxidase

5%

A 52-year-old woman with suspected diabetes mellitus has an oral glucose tolerance test, following the standard WHO protocol. The following results are obtained:

Time (hours)	Blood glucose (mmol/l)
0	5.9
2	8.4

How should these results be interpreted?

- ☐ Impaired fasting glucose and impaired glucose tolerance
- ☐ Normal
- ☐ Diabetes mellitus
- ☐ Impaired glucose tolerance
- ☐ Impaired fasting glucose

Impaired fasting glucose and impaired glucose tolerance

9%

Normal

20%

Diabetes mellitus

7%

Impaired glucose tolerance

59%

Impaired fasting glucose

4%

A diabetic man is diagnosed as having painful diabetic neuropathy in his feet. He has no other medical history of note. What is the most suitable first-line treatment to relieve his pain?

- ☐ Duloxetine
- ☐ Sodium valproate
- ☐ Carbamazepine
- ☐ Referral to pain management clinic
- ☐ Tramadol

Duloxetine

78%

Sodium valproate

2%

Carbamazepine

11%

Referral to pain management clinic

3%

Tramadol

6%

Dr Assem

A 30-year-old woman who is investigated for obesity, hirsutism and oligomenorrhoea is diagnosed as having polycystic ovarian syndrome (PCOS) following an ultrasound scan. She is hoping to start a family and her doctor starts metformin to try and improve her fertility. What is the mechanism of action of metformin in PCOS?

- ☐ Stimulates the release of insulin from the pancreas
- ☐ Blocks the insulin mediated development of multiple immature follicles in the ovaries
- ☐ Increases peripheral insulin sensitivity
- ☐ Blocks the conversion of oestradiol to testosterone
- ☐ Increases hepatic gluconeogenesis

Stimulates the release of insulin from the pancreas

4%

Blocks the insulin mediated development of multiple immature follicles in the ovaries

17%

Increases peripheral insulin sensitivity

61%

Blocks the conversion of oestradiol to testosterone

14%

Increases hepatic gluconeogenesis

5%

The majority of patients with polycystic ovarian syndrome have a degree of insulin resistance which in turn can lead to complicated changes in the hypothalamic-pituitary-ovarian axis.

A 25-year-old man with a family history of multiple endocrine neoplasia type 1 is reviewed in clinic. What is the single most useful investigation to monitor such patients?

- ☐ Short synacthen test
- ☐ Urinary catecholamines
- ☐ Serum calcium
- ☐ Thyroid function tests
- ☐ Serum prolactin

Short synacthen test	6%
Urinary catecholamines	11%
Serum calcium	66%
Thyroid function tests	8%
Serum prolactin	9%

Peptic ulceration, galactorrhoea, hypercalcaemia - multiple endocrine neoplasia type I

Important for me [Less important](#)

The high incidence of parathyroid tumours and hypercalcaemia make serum calcium a useful indicator of MEN type 1 in suspected individuals

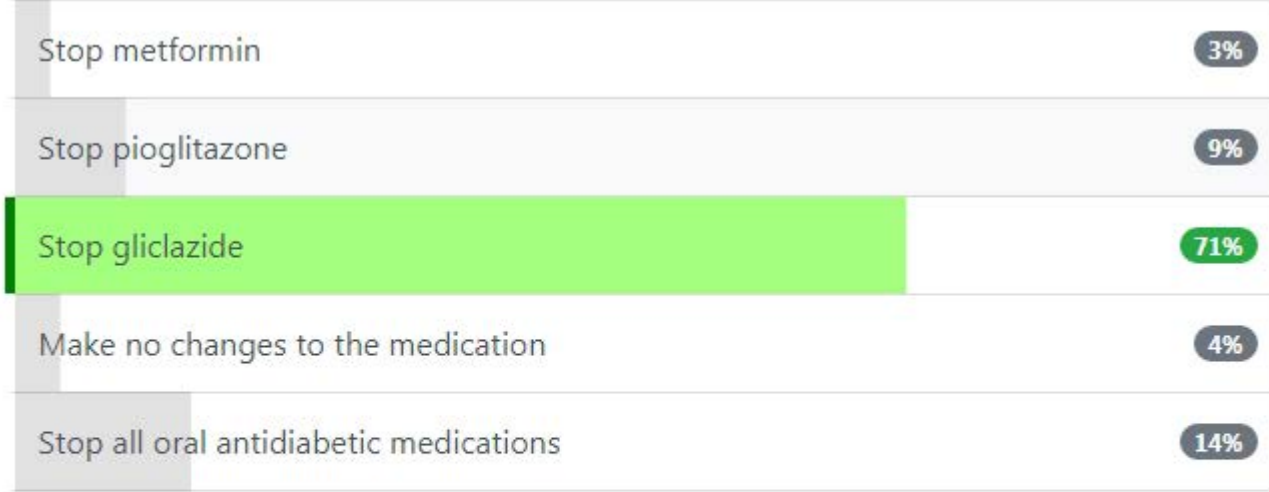
A 78-year-old nursing home resident is admitted to the acute medical unit after being found collapsed in his room. A carer from the nursing home is present and reports that he has had regular 'hypos' recently. On admission he was drowsy and the blood glucose was 1.8 mmol/l. Following intravenous dextrose the patient's condition significantly improved.

His medication on admission is as follows:

Metformin 1g bd
Gliclazide 160mg od
Pioglitazone 45mg od
Aspirin 75mg od
Simvastatin 40mg on

What is the most appropriate initial action?

- ☐ Stop metformin
- ☐ Stop pioglitazone
- ☐ Stop gliclazide
- ☐ Make no changes to the medication
- ☐ Stop all oral antidiabetic medications



Neither metformin nor pioglitazone cause hypoglycaemia. The gliclazide dose is therefore responsible and should be stopped whilst deciding upon longer term changes to his medication.

A 31-year-old female with polycystic ovarian syndrome consults you as she is troubled with excessive facial hair. Switching her combined oral contraceptive pill to co-cyprindiol has had no effect. On examination she has hirsutism affecting her moustache, beard, and temple areas. What is the most appropriate treatment?

- ☐ Topical salicylic acid
- ☐ Topical adapalene
- ☐ Oral clomifene
- ☐ Topical eflornithine
- ☐ Topical tazarotene

Topical salicylic acid

5%

Topical adapalene

7%

Oral clomifene

32%

Topical eflornithine

50%

Topical tazarotene

7%

An 18-year-old girl is admitted to the Emergency Department with an episode of sweating and dizziness. She is brought in by her father who has type 2 diabetes mellitus as he is worried she may be diabetic. He describes a number of similar episodes for the past two weeks. Her BM on admission is 1.9 mmol/l so the following bloods are taken:

Plasma glucose	1.8 mmol/l
Insulin	15 mg/ml (6-10 mg/ml)
Proinsulin	22% (22-24%)
C-peptide	0.15 nmol/l (0.2-0.4 nmol/l)

What is the most likely diagnosis?

- ☐ Diabetes mellitus
- ☐ Insulinoma
- ☐ Nesidioblastosis
- ☐ Insulin abuse
- ☐ Sulfonylurea abuse

Diabetes mellitus

2%

Insulinoma

17%

Nesidioblastosis

4%

Insulin abuse

65%

Sulfonylurea abuse

12%

The raised insulin with low c-peptide level points to a diagnosis of insulin abuse. C-peptide levels would be raised in a patient following sulfonylurea abuse

Dr Assem

A 31-year-old woman presents for review. For the past few months she has been feeling generally tired and has not had a normal period for around 4 months. Prior to this she had a regular 30 day cycle. A pregnancy test is negative, pelvic examination is normal and routine bloods are ordered:

FBC	Normal
U&E	Normal
TFT	Normal
Follicle-stimulating hormone	41 iu/l (< 35 iu/l)
Luteinizing hormone	33 mIU/l (< 20 mIU/l)
Oestradiol	70 pmol/l (> 100 pmol/l)

What is the most likely diagnosis?

- ☐ Ovarian cancer
- ☐ Gonadotropin-producing pituitary adenoma
- ☐ Turner syndrome
- ☐ Premature ovarian failure
- ☐ Aromatase enzyme deficiency

Ovarian cancer

2%

Gonadotropin-producing pituitary adenoma

16%

Turner syndrome

2%

Premature ovarian failure

77%

Aromatase enzyme deficiency

4%

A 93-year-old female who lives alone comes to see you regarding troublesome urge incontinence. Over the past year, you have noted a steady decline and she is becoming increasingly frail. She has had a number of falls while rushing to the bathroom, resulting in attendance at the local emergency department. She previously underwent a course of bladder retraining with no significant improvement in symptoms.

What would be the most appropriate treatment of her urge incontinence?

- ☐ Pelvic floor exercises
- ☐ Immediate release oxybutynin
- ☐ Mirabegron
- ☐ Doxazosin
- ☐ Surgical repair

Pelvic floor exercises	12%
Immediate release oxybutynin	31%
Mirabegron	40%
Doxazosin	11%
Surgical repair	6%

Oxybutynin should not be used in frail older women with urinary incontinence due to the risk of impairment of daily functioning, confusion and acute delirium

Important for me Less important

The correct answer here is mirabegron. According to the latest NICE guidance, first line medical treatment of urge incontinence after bladder retraining can be with oxybutynin, tolterodine or darifenacin. NICE has issued a 'do not use' statement on the use of oxybutynin in frail elderly women due to the risk of cognitive impairment, falls and general decline. This is particularly the case with immediate release preparations. There is no similar statement for tolterodine or darifenacin. A trial of tolterodine or darifenacin, may have been an appropriate answer if this option was given, although these are also associated with anticholinergic side effects. Given the patients' history of general decline and recurrent falls, avoidance of an anticholinergic and treatment with mirabegron would, therefore, be a more appropriate choice than oxybutynin.

Oxybutynin is normally the antimuscarinic of choice in urge incontinence, however, has a high anticholinergic burden. Per NICE guidance it should be avoided in frail older women due to an increased risk of delirium, confusion and impaired function. Given the patients' age, history of gradual decline and recurrent falls, oxybutynin should be avoided. This is particularly the case, given that she lives alone and so increased confusion or delirium may not be picked up straight away, increasing her risk of falls.

Pelvic floor exercises are used in conservative management of stress incontinence not urge incontinence.

Doxazosin is used in the treatment of hypertension and urinary retention. It is likely to worsen her symptoms of urge incontinence.

Surgery is indicated in stress as opposed to urge incontinence.

A 42-year-old man presents to his GP feeling generally unwell. For the past three months he has been experiencing daily frontal headaches which have not been helped by regular paracetamol. He has also noticed some unusual symptoms such as his wedding ring no longer fitting, his shoe size apparently increasing and a small amount of milky discharge from both nipples. On examination his blood pressure is 168/96 mmHg. What is the most likely diagnosis?

- ☐ Phaeochromocytoma
- ☐ Cushing's syndrome
- ☐ Diabetes insipidus
- ☐ Macroprolactinoma
- ☐ Acromegaly

Phaeochromocytoma

3%

Cushing's syndrome

3%

Diabetes insipidus

2%

Macroprolactinoma

15%

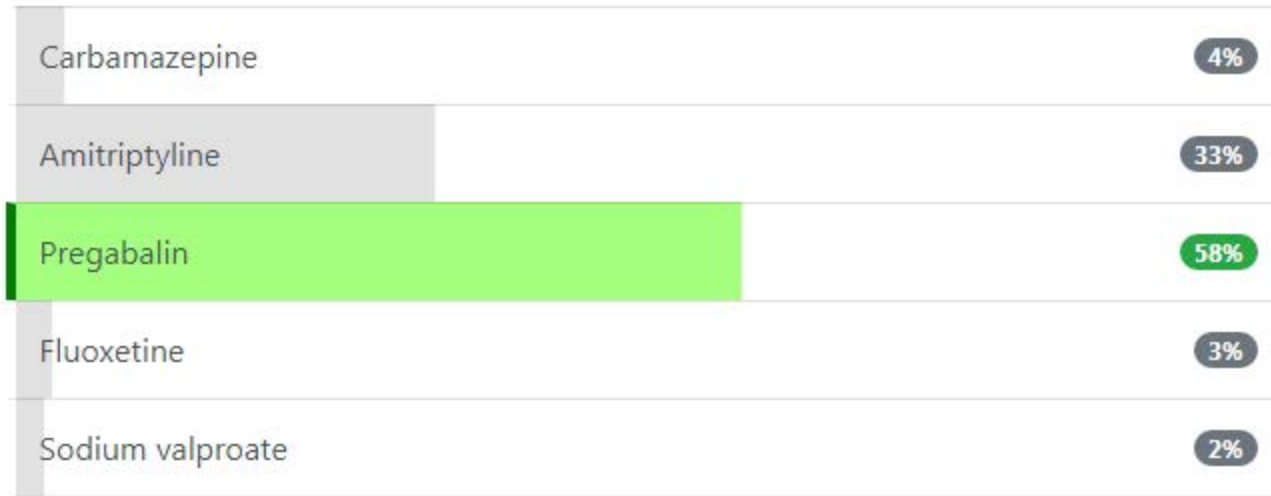
Acromegaly

77%

Dr. S. S. S.

A 67-year-old man who has a history of type 2 diabetes mellitus and benign prostatic hypertrophy presents with burning pain in his feet. This has been present for the past few months and is getting gradually worse. He has tried taking duloxetine but unfortunately has received no benefit. Clinical examination is unremarkable other than diminished sensation to fine touch on both soles. What is the most suitable initial management?

- ☐ Carbamazepine
- ☐ Amitriptyline
- ☐ Pregabalin
- ☐ Fluoxetine
- ☐ Sodium valproate



Amitriptyline would normally be first choice but given his history of benign prostatic hyperplasia it is better to avoid amitriptyline due to the risk of urinary retention.

A 61-year-old man presents as he developed enlargement of his breast tissue. He has become very self-conscious and is worried about going on holiday in the summer. Which one of the following drugs is most likely to be responsible?

- ☐ Amitriptyline
- ☐ Isoniazid
- ☐ Verapamil
- ☐ Methyldopa
- ☐ Spironolactone



All the above drugs may cause gynaecomastia but spironolactone is the most common cause.

A 35-year-old female has recently been diagnosed with Addison's disease due to autoimmune adrenal failure after presenting with a 3-month history of lethargy, nausea, weight loss and fainting. Which of the following physical signs may you find in this patient?

- ☐ Stretch marks on her abdomen
- ☐ Multiple bruises on her limbs
- ☐ Frontal balding
- ☐ Thinning of the axillary hair
- ☐ Cafe au lait spots

Stretch marks on her abdomen

9%

Multiple bruises on her limbs

10%

Frontal balding

10%

Thinning of the axillary hair

55%

Cafe au lait spots

16%

Thinning of pubic and axillary hair is seen in females with Addison's disease due to reduced production of testosterone from the adrenal gland

Important for me Less important

The correct answer is thinning of the axillary hair. The patient has failure of the adrenal gland due to autoimmune attack. As well as deficiency of glucocorticoids and mineralocorticoids, she will have lower levels of androgens, which are usually produced in females by the zona reticularis of the adrenal cortex. This leads to thinning of hair grown at puberty, which is androgen dependent. The scalp hair is unaffected.

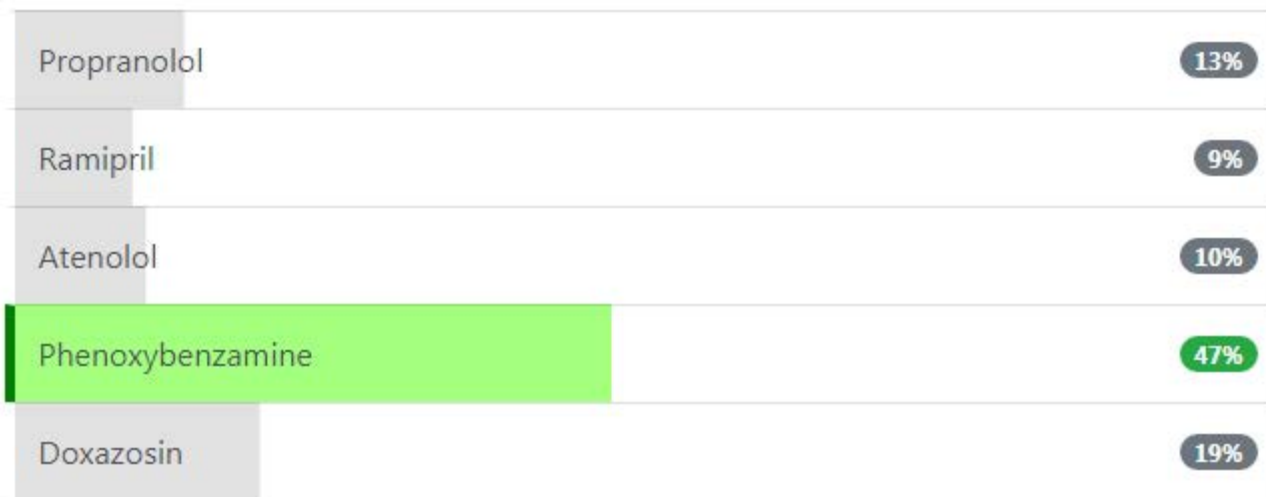
Stretch marks, skin thinning, easy bruising and poor wound healing are found in Cushing's disease or in patients given longterm exogenous steroids. Cafe au lait spots are seen in neurofibromatosis type I.

NICE CKS. Addison's disease.

Dr Assem

A 43-year-old man is found to have a pheochromocytoma. Which anti-hypertensive medication should be started first?

- ☐ Propranolol
- ☐ Ramipril
- ☐ Atenolol
- ☐ Phenoxybenzamine
- ☐ Doxazosin



PHaechromocytoma - give **PH**enoxybenzamine before beta-blockers

Important for me Less important

Phenoxybenzamine is a non-selective alpha-adrenoceptor antagonist and should be started before a beta-blocker is introduced

There is ongoing debate about the optimal medical management of phaeochromocytoma, with the suggestion that antihypertensive treatment regimes other than non specific alpha-blockade are just as effective and safe. There are however no trials to provide an answer to this question yet

A 49-year-old man with type 2 diabetes mellitus is reviewed. Despite weight loss and therapy with metformin and gliclazide his last HbA1c is 7.2%. Which one of the following factors would suggest that the patient may benefit from a meglitinide?

- ☐ Obesity
- ☐ Not adhering to diabetic diet
- ☐ Problems with hypoglycaemia from gliclazide
- ☐ Erratic lifestyle
- ☐ Elderly and frail patients



Meglitinides - stimulate insulin release - good for erratic lifestyle

Important for me Less important

Meglitinides stimulate insulin release and are particularly useful for post-prandial hyperglycaemia or an erratic eating schedule, as patients take them shortly before meals

A 18-year-old man with a background of Marfan syndrome presents to the emergency department with palpitations and sweating. He was hypertensive on admission at 198/101 mmHg. He is also complaining of the development of nodules on his torso and cheek which provide a pins and needle like sensation. A 24 hour urinary catecholamine has been sent and is currently pending.

What is the most likely underlying diagnosis?

- ☐ Thyroid carcinoma
- ☐ MEN type 2A
- ☐ MEN type 1
- ☐ MEN type 2B
- ☐ Pheochromocytoma

Thyroid carcinoma	2%
MEN type 2A	14%
MEN type 1	6%
MEN type 2B	60%
Pheochromocytoma	18%

Medullary thyroid cancer, phaeochromocytoma, marfanoid body habitus - multiple endocrine neoplasia type IIb

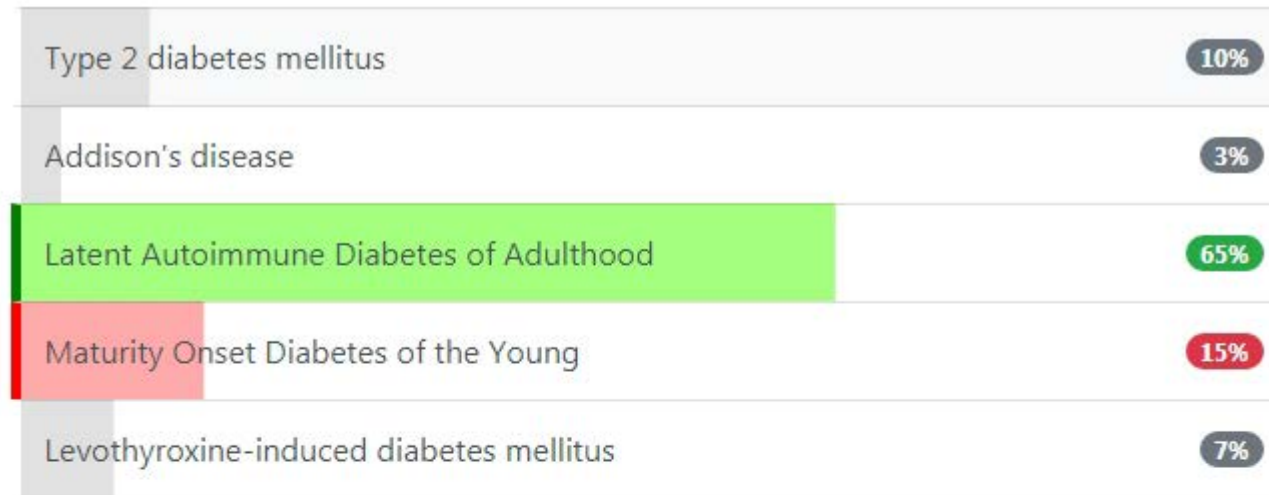
Important for me [Less important](#)

When differentiating between MEN 2A and 2B, it is worth remembering that MEN 2B has similar characteristics as MEN 2A (Thyroid carcinoma's, Adrenal tumours, Parathyroid hyperplasia) but in addition typically have a Marfanoid appearance and mucosal neuromas, as well as the absence of hyperparathyroidism.

MEN type 1 is characterised by pancreatic neuroendocrine tumours, pituitary adenoma and parathyroid hyperplasia.

A 33-year-old white male attends his GP with a two month history of weight loss, lethargy and polydipsia. He has a past medical history of a thyroidectomy for Grave's disease, no significant family history and currently takes levothyroxine. The GP does a capillary glucose measurement, which is 18.1mmol/L and does a urinalysis revealing 2+ glucose and 2+ ketones. His blood pressure is 134/86mmHg. What is the most likely diagnosis?

- ☐ Type 2 diabetes mellitus
- ☐ Addison's disease
- ☐ Latent Autoimmune Diabetes of Adulthood
- ☐ Maturity Onset Diabetes of the Young
- ☐ Levothyroxine-induced diabetes mellitus



Latent autoimmune diabetes of adulthood (LADA) is a disorder in which, despite the presence of islet antibodies at diagnosis of diabetes, the progression of autoimmune -cell failure is slow.

In contrast to type 2 diabetes, patients are typically younger and without an increased body habitus. In contrast to type 1 diabetes, insulin is not usually required in the early stages of the disease.

Diagnosis may be aided through a Glutamic Acid Decarboxylase (GAD) Autoantibodies test and evidence of other autoimmune diseases.

Levothyroxine is not associated with inducing diabetes. In patients with diabetes starting thyroxine, doses of antidiabetic drugs including insulin may need to be increased.

Addison's disease is associated with hypoglycaemia.

A 44-year-old woman presents to her GP as she is feeling 'hot all the time' and is consequently worried she is going through an early menopause. Her husband has also noticed a 'fullness' of her neck which has become apparent over the past few weeks. On examination her pulse is 90/minute and she has a small, non-tender goitre. Blood tests are arranged:

TSH	< 0.05 mu/l
Free T4	24 pmol/l
Anti-thyroid peroxidase antibodies	102 IU/mL (< 35 IU/mL)
ESR	23 mm/hr

What is the most likely diagnosis?

- ☐ Hashimoto's thyroiditis
- ☐ Toxic multinodular goitre
- ☐ Thyroid cancer
- ☐ De Quervain's thyroiditis
- ☐ Graves' disease

Hashimoto's thyroiditis

27%

Toxic multinodular goitre

4%

Thyroid cancer

2%

De Quervain's thyroiditis

7%

Graves' disease

60%

The thyrotoxic symptoms and blood tests, goitre and anti-thyroid peroxidase antibodies suggest a diagnosis of Graves' disease.

Whilst anti-thyroid peroxidase antibodies are seen in 90% of Hashimoto's disease they are also seen in 75% of patients with Graves' disease. Hashimoto's thyroiditis is also generally associated with hypothyroidism, which is not in keeping with this presentation.

The ESR result is within normal range.

A 54-year-old female presents to the Emergency Department concerned about double vision. She is noted to have exophthalmos and conjunctival oedema on examination and a diagnosis of thyroid eye disease is suspected. What can be said regarding her thyroid status?

- ☐ Hyper- or euthyroid
- ☐ Hypothyroid
- ☐ Hyperthyroid
- ☐ Hypo- or euthyroid
- ☐ Eu-, hypo- or hyperthyroid

Hyper- or euthyroid	14%
Hypothyroid	1%
Hyperthyroid	38%
Hypo- or euthyroid	1%
Eu-, hypo- or hyperthyroid	45%

Whilst thyroid eye disease is mostly associated with hyperthyroidism secondary to Graves' disease there is not always an association. A minority of patients will either be euthyroid or hypothyroid.

It is also known that the severity of thyroid eye disease is not related to the degree of thyrotoxicosis in Graves' disease.

A 62-year-old man is investigated for hypertension and proximal myopathy. On examination he is noted to have abdominal striae. Which one of the following is most associated with ectopic ACTH secretion?

- ☐ Carcinoid tumour
- ☐ Small cell lung cancer
- ☐ Cardiac myxoma
- ☐ Squamous cell lung cancer
- ☐ Adrenal carcinoma



Small cell lung cancer accounts 50-75% of case of ectopic ACTH

Important for me Less important

Adrenal carcinoma and cardiac myxoma are causes of ACTH independent Cushing's syndrome

A 40-year-old woman complains of feeling tired all the time and putting on weight. On examination a diffuse, non-tender goitre is noted. Blood tests are ordered:

TSH	15.1 mU/l
Free T4	7.1 pmol/l
ESR	14 mm/hr
Anti-TSH receptor stimulating antibodies	Negative
Anti-thyroid peroxidase antibodies	Positive

What is the most likely diagnosis?

- ☐ Pituitary failure
- ☐ Primary atrophic hypothyroidism
- ☐ De Quervain's thyroiditis
- ☐ Hashimoto's thyroiditis
- ☐ Grave's disease

Dr Assem

Pituitary failure

4%

Primary atrophic hypothyroidism

6%

De Quervain's thyroiditis

7%

Hashimoto's thyroiditis

71%

Grave's disease

12%

Hashimoto's thyroiditis = hypothyroidism + goitre + anti-TPO

Important for me Less important

This patient has Hashimoto's thyroiditis, as evidenced by the hypothyroidism, goitre and anti-thyroid peroxidase antibodies. De Quervain's thyroiditis typically causes a painful goitre and a raised ESR. Around 90% of patients with Grave's disease have anti-TSH receptor stimulating antibodies.

Dr Assem

A 54-year-old man with type 2 diabetes mellitus is reviewed in clinic. He is currently taking pioglitazone, metformin, aspirin and simvastatin. Which one of the following problems is most likely to be caused by pioglitazone?

- ☐ Photosensitivity
- ☐ Thrombocytopaenia
- ☐ Myalgia
- ☐ Peripheral oedema
- ☐ Hyponatraemia

Photosensitivity

10%

Thrombocytopaenia

8%

Myalgia

9%

Peripheral oedema

62%

Hyponatraemia

11%

Pioglitazone may cause fluid retention

Important for me Less important

Each one of the following is associated with Pendred's syndrome, except:

- ☐ Goitre
- ☐ Short 4th and 5th metacarpals
- ☐ Autosomal recessive inheritance
- ☐ Sensorineural deafness
- ☐ Euthyroid status

Goitre

8%

Short 4th and 5th metacarpals

50%

Autosomal recessive inheritance

12%

Sensorineural deafness

7%

Euthyroid status

23%

A 23-year-old woman is diagnosed with Graves' disease. Which one of the following statements regarding treatment is correct?

- Block-and-replace regimes are usually of a shorter duration than carbimazole titration therapy
- Concurrent administration of propranolol and carbimazole should be avoided
- Patients on block-and-replace regimes have fewer side-effects than those using titration therapy
- Carbimazole should be started at no higher than 10mg/day for patients commencing a titration regime
- In the block-and-replace regime levothyroxine should be started at the same time as carbimazole

Block-and-replace regimes are usually of a shorter duration than carbimazole titration therapy

46%

Concurrent administration of propranolol and carbimazole should be avoided

7%

Patients on block-and-replace regimes have fewer side-effects than those using titration therapy

18%

Carbimazole should be started at no higher than 10mg/day for patients commencing a titration regime

14%

In the block-and-replace regime levothyroxine should be started at the same time as carbimazole

15%

A 45-year-old who is currently being investigated for lethargy and reduced libido presents for follow-up. He initially presented after requesting a testosterone blood test due to his reduced sexual drive. This was reported as follows:

Testosterone	5.4 nmol/L (>9.0)
--------------	--------------------

Subsequent blood tests show the following:

Prolactin	450 mU (< 400)
Cortisol (8am)	120 nmol/L (130-690)
FSH	0.8 IU/L (1-8)

What is the most likely diagnosis?

- ☐ Addison's disease
- ☐ Testicular cancer with brain metastases
- ☐ Non-functioning pituitary adenoma
- ☐ Prolactinoma
- ☐ Craniopharyngioma

Addison's disease

11%

Testicular cancer with brain metastases

5%

Non-functioning pituitary adenoma

41%

Prolactinoma

33%

Craniopharyngioma

11%

Non-functioning pituitary tumours present with hypopituitarism and pressure effects

Important for me Less important

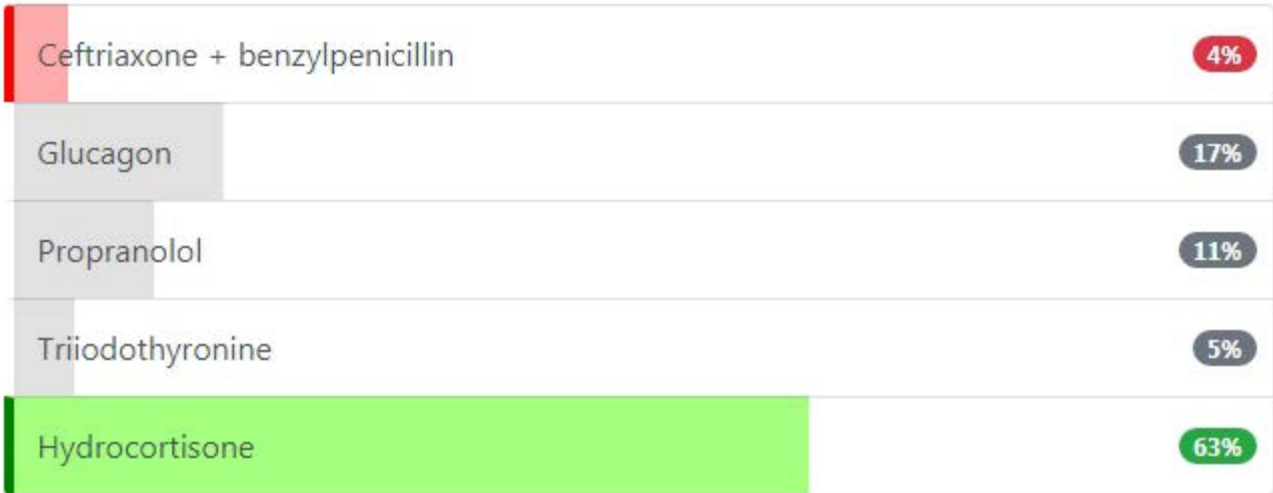
Whilst the prolactin level is slightly raised this can be caused by the pressure effects of the tumour preventing dopamine (which inhibits prolactin release) from reaching the normal prolactin-producing cells. Much higher levels would be expected with a prolactinoma.

A 45-year-old female is admitted to the Emergency Department with abdominal pain associated with vomiting. She has a past medical history of hypothyroidism and takes thyroxine. On examination she is pyrexial at 37.6°C. Pulse is 110 bpm with a blood pressure of 100/64 mmHg. Blood results show the following:

Na ⁺	131 mmol/l
K ⁺	4.9 mmol/l
Urea	8.1 mmol/l
Creatinine	110 µmol/l
Glucose	3.3 mmol/l

What treatment should be given first?

- ☐ Ceftriaxone + benzylpenicillin
- ☐ Glucagon
- ☐ Propranolol
- ☐ Triiodothyronine
- ☐ Hydrocortisone



This is a typical history of Addison's. Patients may have a history of other autoimmune conditions such as thyroid disorders. Steroids should be given as soon as possible

A 32 year-old man presents complaining of persistent headaches. He was diagnosed with hypertension 4 months ago and started on perindopril. On examination, heart his rate is 75 beats per minute and blood pressure is 185/115mmHg.

Investigations:

Serum potassium	1.9 mmol/L (3.5-5.0)
Plasma aldosterone (after 30 minutes supine)	700 pmol/L (135-400)
Plasma renin activity (after 30 minutes supine)	0.4 pmol/mL/hr (1.1-2.7)

What is the most likely cause of his hypertension?

- ☐ Addison disease
- ☐ Bilateral renal artery stenosis
- ☐ Coarctation of the aorta
- ☐ Pheochromocytoma
- ☐ Primary hyperaldosteronism

Addison disease	6%
Bilateral renal artery stenosis	11%
Coarctation of the aorta	4%
Phaeochromocytoma	9%
Primary hyperaldosteronism	71%

Primary hyperaldosteronism is typically caused by an aldosterone producing adenoma (Conn's syndrome), other causes include: bilateral adrenocortical hyperplasia and adrenal carcinoma.

Primary hyperaldosteronism and bilateral renal artery stenosis are associated with hypokalaemia due raised serum aldosterone, which causes increased sodium reabsorption and potassium excretion.

Aldosterone is elevated in bilateral renal artery stenosis due to reduced renal perfusion. Aldosterone is high in primary hyperaldosteronism, however, serum renin is usually low in primary hyperaldosteronism due to the resulting hypertension causing excessive renal perfusion, which results in decreased renin production (negative feedback mechanism). High renin levels are seen in renal artery stenosis as renal perfusion is permanently reduced, despite hypertension, due to the stenotic renal arteries.

(Reference: Oxford handbook of clinical medicine, 8th ed.pg.220)

Dr Assem

An 24-year-old woman is reviewed due to facial hirsutism. You suspect a diagnosis of polycystic ovarian syndrome (PCOS). Which one of the following features would suggest the need for further investigations before confidently making a diagnosis of PCOS?

☐ Clitoromegaly

☐ Acanthosis nigricans

☐ Obesity

☐ Amenorrhoea

☐ Acne

Clitoromegaly

50%

Acanthosis nigricans

13%

Obesity

6%

Amenorrhoea

26%

Acne

4%

Clitoromegaly is seen occasionally in PCOS but is normally associated with very high androgen levels. If clitoromegaly is found then further investigations to exclude an ovarian or adrenal androgen secreting tumour are required.

Which one of the following hormones is under continuous inhibition?

- ☐ Growth hormone
- ☐ Prolactin
- ☐ Gonadotropin releasing hormone
- ☐ Thyroid releasing hormone
- ☐ Adrenocorticotrophic hormone

Growth hormone

13%

Prolactin

66%

Gonadotropin releasing hormone

7%

Thyroid releasing hormone

7%

Adrenocorticotrophic hormone

7%

Prolactin - under continuous inhibition

Important for me Less important

Prolactin is unique amongst the pituitary hormones in being tonically inhibited by the hypothalamus

A 49-year-old female was admitted to the emergency department with confusion. A history is unobtainable due to this confusion, with a Glasgow coma scale score of 13/15. Hospital records note a 2-month background of recurrent urinary tract infections (UTI's) and recent admission for urosepsis. Her past medical history includes: Type 2 diabetes mellitus, hypertension, hypercholesterolaemia and a hiatus hernia.

On examination the patient is cool peripherally with a cap refill of 3 seconds, dry mucus membranes, heart sounds 1+2+0, vesicular breath sounds, abdomen was soft, but tender over the suprapubic area. There was no rigidity or guarding and bowel sounds were present.

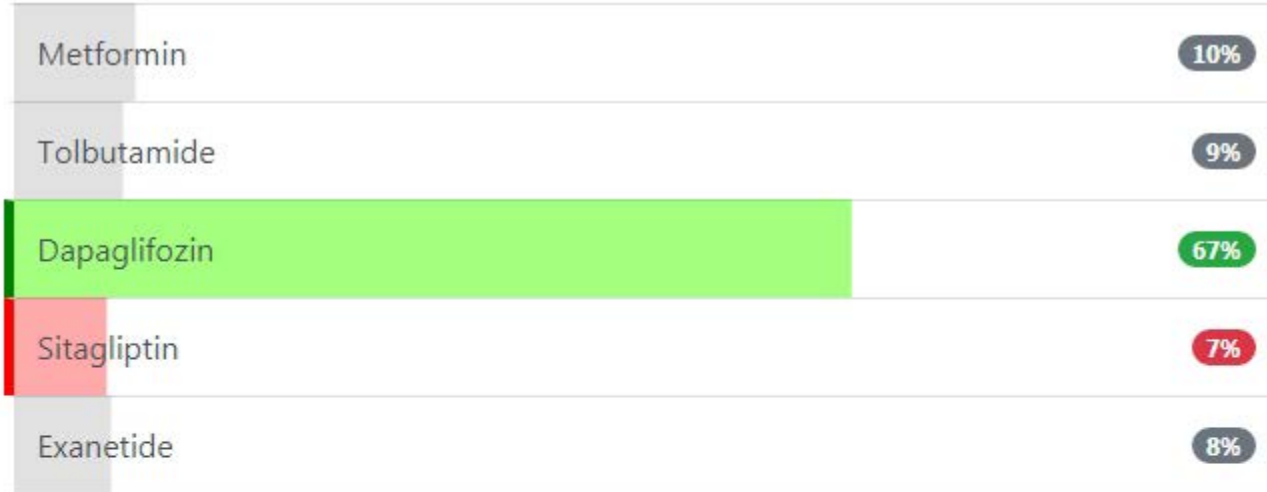
Observations: Respiratory rate 16 breaths per minute, saturations 98% on air, blood pressure 80/58mmHg, heart rate 122 beats per minute, temperature 38.4°C and capillary glucose 16 mmol/L.

Urine dip showed:

Nitrites	+++
Leucocyte esterase	+++
Blood	+
Glucose	+++
Ketones	-
Protein	-

Which medication is likely to contributing to the cause of her presentations?

- ☐ Metformin
- ☐ Tolbutamide
- ☐ Dapagliflozin
- ☐ Sitagliptin
- ☐ Exanetide



Dapagliflozin is a member of the gliflozin anti-diabetic drugs. The medication works by inhibiting the sodium-glucose transport proteins (SGLT2), which reabsorbs glucose in the proximal tubule. The drug has recently been licensed by national institute of clinical excellence (NICE) for the treatment of type 2 diabetes mellitus. Dapagliflozin can be tried if blood sugars are poorly controlled following commencement of metformin and the patient is unable to take a sulfonylurea. Common side effects are often secondary to the glycosuria, which include increased predisposition of urinary tract infection and dehydration.

Dr Assem

A 30-year-old female is started on carbimazole 20mg bd following a diagnosis of Grave's disease. What is the best biochemical marker to assess her response to treatment?

☐ Total T4

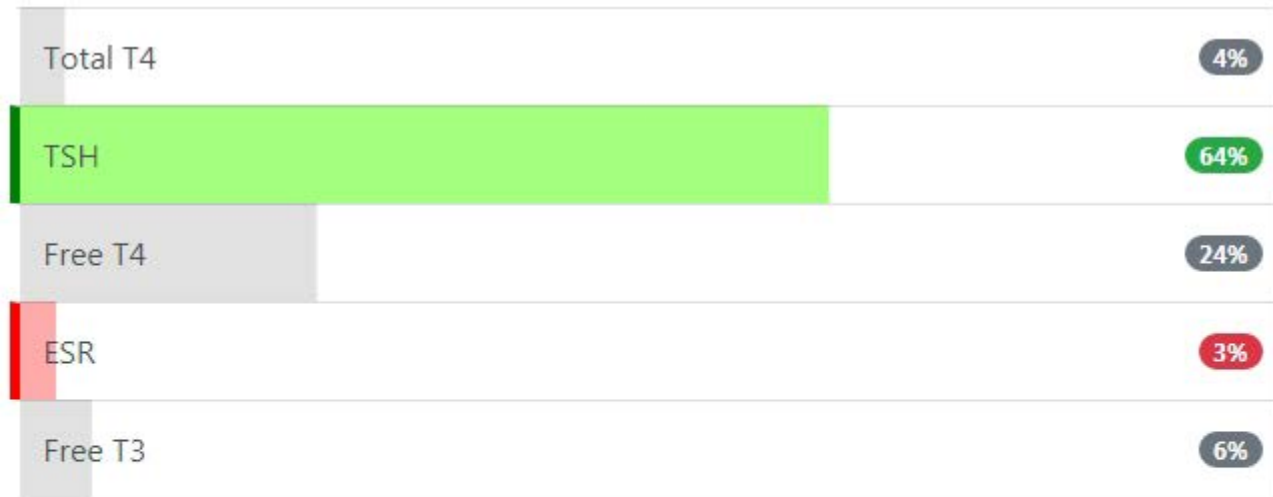
☐ TSH

☐ Free T4

☐ ESR

☐ Free T3

Dr Assem



The answer the College are looking for is TSH. There is however a significant proportion of patients for whom TSH monitoring alone is insufficient. TSH may remain suppressed for several weeks as continued production of thyroid stimulating immunoglobulins seen in Grave's disease reduces the need for the pituitary to secrete TSH

A 23-year-old woman presents for review. She has not had a normal period for around 8 months now. A recent pregnancy test was negative. Blood tests are ordered:

FSH	2.2 IU/L (0-20 IU/L)
Oestradiol	84 pmol/l (100-500 pmol/l)
Thyroid stimulating hormone	3.1 mIU/L
Prolactin	2 ng/ml (0-10 ng/ml)
Free androgen index	3 (< 7)

What is the most likely cause of her symptoms?

- ☐ Prolactinoma
- ☐ Premature ovarian failure
- ☐ Polycystic ovarian syndrome
- ☐ Addison's disease
- ☐ Excessive exercise



The bloods show a hypothalamic amenorrhoea which may be caused by stress or excessive exercise. The FSH would be raised in premature ovarian failure.

Which of the following is least recognised as a potential complication of acromegaly?

- ☐ Colorectal cancer
- ☐ Hypertension
- ☐ Cardiomyopathy
- ☐ Diabetes mellitus
- ☐ Pulmonary hypertension



Acromegaly is associated with systemic rather than pulmonary hypertension.

Secondary causes of pulmonary hypertension include COPD, congenital heart disease (Eisenmenger's syndrome), recurrent pulmonary embolism, HIV and sarcoidosis.

A 55-year-old taxi driver with type 2 diabetes mellitus comes for review. When he was diagnosed 12 months ago he was started on metformin and the dose was titrated up. His IFCC-HbA1c one year ago was 75 mmol/mol (DCCT-HbA1c 9%) and is now 69 mmol/mol (8.5%). His body mass index is 33 kg/m². What is the most appropriate next step in management?

- ☐ Add exenatide
- ☐ Add sitagliptin
- ☐ Add glipizide
- ☐ Make no changes to his medication
- ☐ Add insulin

Add exenatide	23%
Add sitagliptin	53%
Add glipizide	13%
Make no changes to his medication	4%
Add insulin	6%

His HbA1c is still significantly above target so some change to the medication is indicated.

The NICE type 2 diabetes mellitus guidelines would *generally* advocate the use of a sulfonylurea in this situation.

However, the patient is a taxi driver and overweight. A DPP-4 inhibitor such as sitagliptin would be ideal in this situation. There is no risk of hypoglycaemia and they DPP-4 inhibitors are weight neutral.

A 75-year-old woman with a history of hypothyroidism is admitted to the Emergency Department following an episode of chest pain. She is diagnosed as having an acute coronary syndrome and iron-deficiency anaemia. A percutaneous coronary intervention is performed and a coronary artery stent is inserted. Endoscopies of the upper and lower gastrointestinal tract are performed and reported as normal. She is discharged on the following drugs in addition to her regular levothyroxine: aspirin, clopidogrel, ramipril, lansoprazole, simvastatin and ferrous sulphate. Six weeks later she complains of feeling tired all the time. Her GP arranges some routine blood tests:

Hb	11.9 g/dl
Platelets	155 * 10 ⁹ /l
WBC	5.2 * 10 ⁹ /l

Free T4	8.1 pmol/l
TSH	8.2 mu/l

Prior to her recent admission the TSH has been within range for the past two years. Which one of the following new drugs most likely explains the raised TSH?

- ☐ Simvastatin
- ☐ Clopidogrel
- ☐ Ferrous sulphate
- ☐ Ramipril
- ☐ Lansoprazole

Simvastatin

15%

Clopidogrel

9%

Ferrous sulphate

47%

Ramipril

9%

Lansoprazole

19%

Iron reduces the absorption of thyroxine

Important for me

Less important

Which one of the following may be associated with galactorrhoea?

☐ Primary hypothyroidism

☐ Addison's disease

☐ Cushing's syndrome

☐ Grave's disease

☐ Bromocriptine

Primary hypothyroidism

39%

Addison's disease

6%

Cushing's syndrome

16%

Grave's disease

7%

Bromocriptine

32%

Dr. Assem

You review a 47-year-old man one year after he was diagnosed with prediabetes. Last year he had a HbA1c taken after being diagnosed as having hypertension. This was recorded as being 43 mmol/mol (6.1%). His most recent blood test is recorded as being 45 mmol/mol (6.3%) despite the patient reporting that he has changed his diet as instructed and exercising three times a week. His body mass index (BMI) today is 26.5 kg/m². Last year it was 27.5 kg/m². What is the most appropriate course of action?

- ☐ Start metformin
- ☐ Start pioglitazone
- ☐ Review again in 12 months
- ☐ Start orlistat
- ☐ Do a oral glucose tolerance test

Start metformin

47%

Start pioglitazone

3%

Review again in 12 months

22%

Start orlistat

3%

Do a oral glucose tolerance test

25%

NICE recommend metformin for adults at high risk 'whose blood glucose measure (fasting plasma glucose or HbA1c) shows they are still progressing towards type 2 diabetes, despite their participation in an intensive lifestyle-change programme'.

A 48-year-old lady is seen in the diabetes clinic with uncontrolled blood sugars ranging from 14 mmol/L to 22 mmol/L. She has a past medical history of type 2 diabetes, ischaemic heart disease, rheumatoid arthritis and recurrent episodes of thrush alongside chronic obstructive pulmonary disease. Her body mass index is 30. Which medical co-morbidity is the strongest contraindication to starting an SGLT2 (sodium glucose transport protein 2) inhibitor class of drugs?

- ☐ Ischaemic heart disease
- ☐ Chronic obstructive pulmonary disease
- ☐ Type 2 diabetes
- ☐ Rheumatoid arthritis
- ☐ Recurrent thrush

Ischaemic heart disease	33%
Chronic obstructive pulmonary disease	6%
Type 2 diabetes	5%
Rheumatoid arthritis	5%
Recurrent thrush	51%

Dapagliflozin is a newer drug for the treatment of diabetes. It is a member of the sodium-glucose transport protein 2 (SGLT2) inhibitor class of drugs.

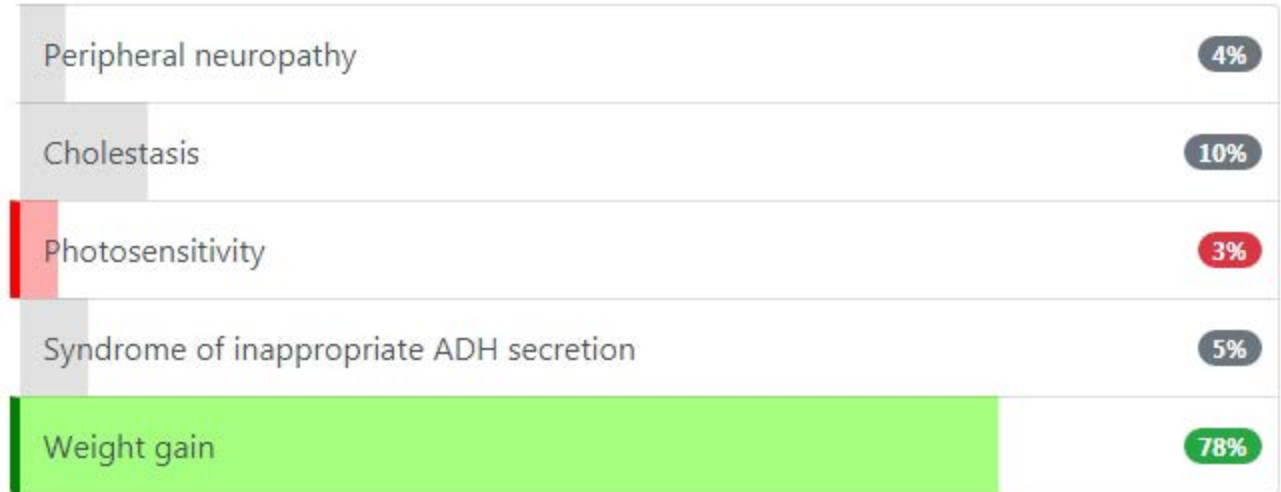
SGLT2 inhibitors prevent the resorption of glucose from the proximal renal tubule, resulting in more glucose being secreted in the urine. Due to an increased amount of glucose being secreted in the urine, these medications are contra-indicated in patients with recurrent thrush. The increased amount of glucose in the urine is thought to predispose to bacterial growth. It should also be noted that urine dip sticks will test positive for glucose.

The other medications in this class include: canagliflozin & empagliflozin

The other answers are distractors with no known contraindication to SGLT2 inhibitor use in ischaemic heart disease, chronic obstructive pulmonary disease or rheumatoid arthritis. SGLT2's are indicated in patients with type 2 diabetes. Note that although trials are ongoing, SGLT2 inhibitors are not currently licensed as an adjunct in patients with type 1 diabetes.

Which one of the following unwanted effects is most likely to occur in patients taking gliclazide?

- ☐ Peripheral neuropathy
- ☐ Cholestasis
- ☐ Photosensitivity
- ☐ Syndrome of inappropriate ADH secretion
- ☐ Weight gain



All of the above side-effects may be seen in patients taking sulfonylureas but weight gain is the most common.

A 54-year-old man is reviewed shortly after being diagnosed with hypertension. as part of his work-up he had a series of blood tests to screen for other risk factors:

Na ⁺	142 mmol/l
K ⁺	3.9 mmol/l
Urea	6.2 mmol/l
Creatinine	91 µmol/l

Fasting glucose	7.7 mmol/l
-----------------	------------

Total cholesterol	7.2 mmol/l
-------------------	------------

Based on the fasting glucose result you arrange a HbA1c:

HbA1c	31 mmol/mol (5.0%)
-------	--------------------

Which one of the following would explain the discrepancy between the HbA1c and fasting glucose levels?

- ☐ Vitamin B12 deficiency
- ☐ Conn's syndrome
- ☐ Raised cholesterol level
- ☐ Sickle-cell anaemia
- ☐ A history of alcohol excess

Vitamin B12 deficiency

10%

Conn's syndrome

10%

Raised cholesterol level

18%

Sickle-cell anaemia

49%

A history of alcohol excess

13%

Dr Assem

A 52-year-old woman who was diagnosed as having primary atrophic hypothyroidism 12 months ago is reviewed following recent thyroid function tests (TFTs):

TSH	12.5 mU/l
Free T4	14 pmol/l

She is currently taking 75mcg of levothyroxine once a day. How should these results be interpreted?

- ☐ Poor compliance with medication
- ☐ Her thyroxine dose needs to be increased
- ☐ Evidence of recent systemic steroid therapy
- ☐ She is on the correct dose
- ☐ T4 to T3 conversion disorder

Poor compliance with medication	50%
Her thyroxine dose needs to be increased	30%
Evidence of recent systemic steroid therapy	4%
She is on the correct dose	10%
T4 to T3 conversion disorder	7%

The TSH level is high. This implies that over recent days/weeks her body is thyroxine deficient. However, her free T4 is within normal range. The most likely explanation is that she started taking the thyroxine properly just before the blood test. This would correct the thyroxine level but the TSH takes longer to normalise.

A 29-year-old female who is 7 weeks into her first pregnancy is investigated for excessive sweating and tremor. Blood tests reveal the following:

TSH	< 0.05 mu/l
T4	188 nmol/l

What is the most appropriate management?

- ☐ Immediate surgery
- ☐ Carbimazole
- ☐ Surgery at start of third trimester
- ☐ Propylthiouracil
- ☐ Radioiodine

Immediate surgery	6%
Carbimazole	15%
Surgery at start of third trimester	5%
Propylthiouracil	68%
Radioiodine	5%

According to CKS:

Propylthiouracil is used in the first trimester of pregnancy in place of carbimazole, as the latter drug may be associated with an increased risk of congenital abnormalities. At the beginning of the second trimester, the woman should be switched back to carbimazole, as propylthiouracil has been associated with a small risk of severe hepatic injury.

A 54-year-old-woman with known ovarian cancer presents with confusion. She has become progressively confused over the last few days, and prior to that, she had started to become constipated. Her family describes poor oral intake of fluids and poor urinary output as well. On further discussion with the family, they mention that she was seen in oncology clinic two weeks ago with results of a bone scan which they had been told was normal.

On examination, she appears dehydrated.

Hb	147 g/l
Platelets	$321 \times 10^9/l$
WBC	$7.8 \times 10^9/l$
Na ⁺	142 mmol/l
K ⁺	4.7 mmol/l
Urea	4.6 mmol/l
Creatinine	92 μ mol/l
Corrected calcium	3.2 mmol/l
Parathyroid hormone	Pending

What is the most likely cause of her elevated calcium?

- ☐ Osteolytic hypercalcaemia
- ☐ Calcitriol-mediated hypercalcaemia
- ☐ Ectopic PTH secretion
- ☐ Parathyroid-hormone-related peptide release
- ☐ Primary hyperparathyroidism

Osteolytic hypercalcaemia

11%

Calcitriol-mediated hypercalcaemia

4%

Ectopic PTH secretion

21%

Parathyroid-hormone-related peptide release

46%

Primary hyperparathyroidism

18%

The correct answer is parathyroid-hormone-related peptide release. Whilst this is classically described as secondary to squamous cell lung cancer, it can occur in many malignancies. The two most common causes of hypercalcaemia are malignancy and primary hyperparathyroidism. In malignancy, roughly 80% of cases are due to parathyroid-hormone-related peptide release. The vast majority of remaining cases are due to osteolysis, and some due to calcitriol-mediated hypercalcaemia and ectopic PTH secretion. Primary hyperparathyroidism is another common cause but is not as likely as malignant hypercalcaemia given the known diagnosis of ovarian cancer.

Source:

'Hypercalcaemia of Malignancy.' BMJ Best Practice. 14 June 2016.

Dr Assem

Which one of the following is least associated with hypercalcaemia?

- ☐ Sarcoidosis
- ☐ Primary hyperparathyroidism
- ☐ Thiazide diuretics
- ☐ Squamous cell lung cancer
- ☐ Monoclonal gammopathy of uncertain significance

Sarcoidosis	3%
Primary hyperparathyroidism	5%
Thiazide diuretics	19%
Squamous cell lung cancer	10%
Monoclonal gammopathy of uncertain significance	64%

One of the key differentiating features between monoclonal gammopathy of uncertain significance (MGUS) and myeloma is the absence of complications such as immune paresis, hypercalcaemia and bone pain

A 44-year-old woman presents with a neck lump. She reports tiredness and fatigue and has put on around 3kilograms of weight recently; she reports going up 3 belt notches. Her blood results show normocytic anaemia.

On palpation of her neck, a hard, fixed, painless lump is felt.

Which one of the following complications is associated with her condition?

- ☐ Hyperthyroidism
- ☐ Retroperitoneal fibrosis
- ☐ Ascites
- ☐ Atrial fibrillation
- ☐ Photosensitivity

Hyperthyroidism

10%

Retroperitoneal fibrosis

50%

Ascites

15%

Atrial fibrillation

17%

Photosensitivity

8%

Riedel's thyroiditis is associated with retroperitoneal fibrosis

Important for me Less important

Riedel thyroiditis (RT) is characterized by the replacement of normal thyroid parenchyma with dense fibrotic tissue and by the extension of this fibrosis to adjacent structures of the neck. Most patients are euthyroid, but hypothyroidism is noted in approximately 30% of cases.

Patient's may present with a painless neck lump and symptoms of hypothyroidism such as weight gain, tiredness, fatigue and intolerance.

Riedel's thyroiditis is not associated with hyperthyroidism, ascites or photosensitivity and therefore these answers are incorrect.

Atrial fibrillation is a complication of hyperthyroidism and patients with AF should have their thyroid function assessed. However, there is no evidence to suggest that Riedel's thyroiditis is associated with atrial fibrillation.

Dr Assem

A 15-year-old girl is investigated for primary amenorrhoea, despite having developed secondary sexual characteristics at 11 years of age. On examination she has well developed breasts with scanty pubic hair and small bilateral groin swellings. What is the most likely diagnosis?

- ☐ Congenital adrenal hyperplasia
- ☐ Polycystic ovarian syndrome
- ☐ Turner's syndrome
- ☐ Complete androgen insensitivity syndrome
- ☐ Mullerian duct agenesis

Congenital adrenal hyperplasia

16%

Polycystic ovarian syndrome

3%

Turner's syndrome

13%

Complete androgen insensitivity syndrome

53%

Mullerian duct agenesis

15%

A 25-year-old female has type I diabetes. Her HbA1c is 58 mmol/L. Her blood pressure is 126/68 mmHg. Her BMI is 28 kg/m². She is using a basal-bolus regimen which she finds easy to manage. She is not keen to increase her total insulin dose. Which of the following adjuncts could you consider to help improve her glycaemic control?

- ☐ Add metformin
- ☐ Switch to a mixed insulin regime
- ☐ Add sitagliptin
- ☐ Add exenatide
- ☐ Enrol in supported weight loss programme

Add metformin	44%
Switch to a mixed insulin regime	11%
Add sitagliptin	9%
Add exenatide	13%
Enrol in supported weight loss programme	24%

Patients with type I diabetes and a BMI > 25 should be considered for metformin in addition to insulin

Important for me Less important

The correct answer is to add metformin. NICE recommends that adding metformin should be considered in type I diabetics with a BMI > 25, either on patient preference or to avoid the need to increase their insulin therapy. The other oral diabetic medications are not currently recommended. Weight loss is likely to be beneficial but there is greater evidence for benefit with the use of metformin. A mixed insulin regime might be used if a multiple injection basal-bolus regime was not suited to the patient's lifestyle but is not usually chosen for better glycaemic control.

NICE: Type I diabetes in adults

<https://www.nice.org.uk/quidance/nq17/chapter/1-recommendations>

A 4-year-old boy is being investigated for failure to thrive and generalised weakness. His blood pressure is normal. The following blood results are obtained:

Na ⁺	137 mmol/l
K ⁺	3.0 mmol/l
Urea	4.5 mmol/l
Creatinine	65 µmol/l
Bicarbonate	33 mmol/l

What is the most likely diagnosis?

- ☐ Conn's syndrome
- ☐ Bartter's syndrome
- ☐ Cushing's syndrome
- ☐ 21-hydroxylase deficiency
- ☐ Liddle's syndrome

Conn's syndrome	11%
Bartter's syndrome	55%
Cushing's syndrome	4%
21-hydroxylase deficiency	13%
Liddle's syndrome	16%

Bartter's syndrome is associated with normotension

Important for me Less important

Bartter's syndrome is the most likely diagnosis. Congenital adrenal hyperplasia due to 21-hydroxylase deficiency is associated with precocious puberty rather than failure to thrive in boys. Both Conn's and Cushing's are associated with hypertension and are not common in this age group.

Liddle's syndrome is a rare autosomal dominant condition that causes hypertension and hypokalaemic alkalosis. It is thought to be caused by disordered sodium channels in the distal tubules leading to increased reabsorption of sodium.

A 46-year-old man with suspected diabetes mellitus has an oral glucose tolerance test, following the standard WHO protocol. The following results are obtained:

Time (hours)	Blood glucose (mmol/l)
0	5.7
2	7.6

How should these results be interpreted?

- ☐ Normal
- ☐ Impaired fasting glucose and impaired glucose tolerance
- ☐ Diabetes mellitus
- ☐ Impaired glucose tolerance
- ☐ Impaired fasting glucose

Normal

50%

Impaired fasting glucose and impaired glucose tolerance

8%

Diabetes mellitus

4%

Impaired glucose tolerance

30%

Impaired fasting glucose

8%

Both the fasting and two-hour glucose are within normal limits.

Dr Assef

An insulin stress test is most useful in the investigation of:

- ☐ Glucagonoma
- ☐ Insulinoma
- ☐ Addison's disease
- ☐ Hypopituitarism
- ☐ Diabetes mellitus

Glucagonoma

24%

Insulinoma

26%

Addison's disease

8%

Hypopituitarism

39%

Diabetes mellitus

2%

Insulin stress tests are also occasionally used to differentiate Cushing's from pseudo-Cushing's

Which one of the following types of oral steroid has the least amount of mineralocorticoid activity?

☐ Fludrocortisone

☐ Hydrocortisone

☐ Dexamethasone

☐ Prednisolone

☐ Cortisone

Fludrocortisone

13%

Hydrocortisone

10%

Dexamethasone

53%

Prednisolone

18%

Cortisone

7%

This is clinically relevant as there are some situations where it is important to combine high glucocorticoid (anti-inflammatory) activity with minimal mineralocorticoid (fluid-retention) effects. A good example is the use of dexamethasone for patients with raised intracranial pressure secondary to brain tumours.

A 62-year-old HGV driver is reviewed. He was diagnosed last year with type 2 diabetes mellitus. Following weight loss and metformin his HbA1c has decreased from 74 mmol/mol (8.9%) to 68 mmol/mol (8.4%). What is the most suitable next step in management?

- ☐ Add exenatide
- ☐ Make no changes to management
- ☐ Add gliclazide
- ☐ Stop metformin for a period to ensure hypoglycaemic awareness is not lost
- ☐ Add pioglitazone

Add exenatide

18%

Make no changes to management

15%

Add gliclazide

25%

Stop metformin for a period to ensure hypoglycaemic awareness is not lost

3%

Add pioglitazone

39%

Pioglitazone is the best option here as it would not put him at risk of hypoglycaemia, which obviously could be dangerous given his job. The NICE guidelines would also support the use of a DPP-4 inhibitor (e.g. sitagliptin or vildagliptin) in this situation.

A 47-year-old woman is referred to the general medical clinic. She has gained 10 kg in weight in the past 3 months but her main problem is episodic sweating. These episodes of sweating are associated with double vision and typically occur early in the morning. Clinical examination is unremarkable. What is the most likely diagnosis?

- ☐ Bronchial carcinoid
- ☐ Hashimoto's thyroiditis
- ☐ Menopause
- ☐ Cushing's syndrome
- ☐ Insulinoma

Bronchial carcinoid

11%

Hashimoto's thyroiditis

11%

Menopause

10%

Cushing's syndrome

22%

Insulinoma

46%

This is a typical presentation of insulinoma

Dr Assem

You review a 52-year-old man who is being investigated for weight gain, impotence and hypertension. On examination you record a blood pressure of 180/110 mmHg and notice purple striae around his abdomen. He also has some difficulty getting up from a chair and you observe generalised decreased muscle strength. Routine bloods are ordered. Given the likely underlying diagnosis, what are the urea and electrolytes most likely to show?

- ☐ Hypokalaemic metabolic acidosis
- ☐ Hyperkalaemic metabolic alkalosis
- ☐ Hypocalcaemic metabolic acidosis
- ☐ Hypokalaemic metabolic alkalosis
- ☐ Hyperkalaemic metabolic acidosis

Hypokalaemic metabolic acidosis

17%

Hyperkalaemic metabolic alkalosis

10%

Hypocalcaemic metabolic acidosis

4%

Hypokalaemic metabolic alkalosis

60%

Hyperkalaemic metabolic acidosis

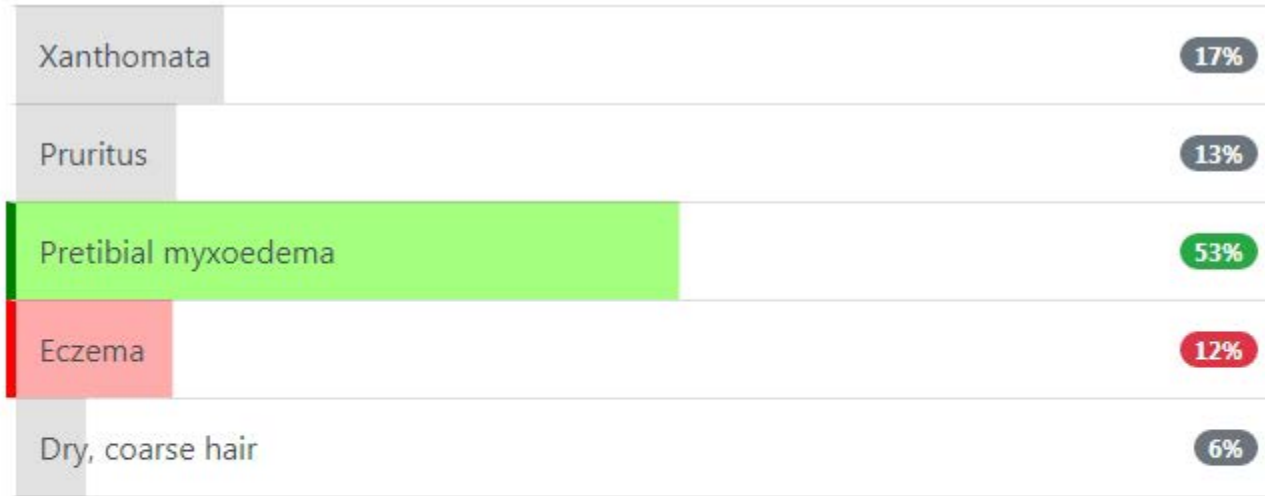
9%

Cushing's syndrome - hypokalaemic metabolic alkalosis

Important for me Less important

Which one of the following skin disorders is least associated with hypothyroidism?

- ☐ Xanthomata
- ☐ Pruritus
- ☐ Pretibial myxoedema
- ☐ Eczema
- ☐ Dry, coarse hair



For the purposes of postgraduate exams pretibial myxoedema is associated with thyrotoxicosis. There are however case reports of it been found in hypothyroid patients, especially the diffuse non-pitting variety

You are conducting the annual review of a 44-year-old woman who has type 1 diabetes mellitus. You want to assess for diabetic neuropathy affecting the feet.

What is the most appropriate screening test to use?

- ☐ A standardised questionnaire
- ☐ Doppler flow studies of the dorsalis pedis pulse
- ☐ Nerve conduction studies
- ☐ Test sensation using cotton wool
- ☐ Test sensation using a 10 g monofilament

A standardised questionnaire

6%

Doppler flow studies of the dorsalis pedis pulse

5%

Nerve conduction studies

10%

Test sensation using cotton wool

11%

Test sensation using a 10 g monofilament

69%

A 10 g monofilament should be used to assess for diabetic neuropathy in the feet

Important for me Less important

A 35-year-old female who has recently being diagnosed with Grave's disease presents for review 3 months after starting a 'block and replace' regime with carbimazole and thyroxine. She is concerned about developing thyroid eye disease. What is the best way that her risk of developing thyroid eye disease can be reduced?

- ☐ Reduce alcohol intake
- ☐ A diet rich in omega-3 fatty acids
- ☐ Regular exercise
- ☐ Stop smoking
- ☐ Lose weight

Reduce alcohol intake

6%

A diet rich in omega-3 fatty acids

9%

Regular exercise

2%

Stop smoking

80%

Lose weight

3%

Smoking is the most important modifiable risk factor for the development of thyroid eye disease

An obese 48-year-old man presents with lethargy and polydipsia. What is the minimum HbA1c that would be diagnostic of type 2 diabetes mellitus?

- ☐ Cannot use HbA1c for diagnosis
- ☐ 6.0% (42 mmol/mol)
- ☐ 6.3% (45 mmol/mol)
- ☐ 6.5% (48 mmol/mol)
- ☐ 7.0% (53 mmol/mol)

Cannot use HbA1c for diagnosis

8%

6.0% (42 mmol/mol)

5%

6.3% (45 mmol/mol)

5%

6.5% (48 mmol/mol)

70%

7.0% (53 mmol/mol)

13%

Diabetes mellitus - HbA1c of 48 mmol/mol (6.5%) or greater is now diagnostic (WHO 2011)

Important for me Less important

A 45-year-old man is investigated following referral to the endocrinology clinic with polydipsia. Plasma glucose and calcium are normal. A water deprivation test is performed with the following results:

Starting plasma osm.	319 mOsmol/l (275-295 mOsmol/l)
Final urine osm.	142 mOsmol/l
Urine osm. post-DDAVP	885 mOsmol/l

What is the most likely diagnosis?

- ☐ Psychogenic polydipsia
- ☐ Nephrogenic diabetes insipidus
- ☐ Primary hyperparathyroidism
- ☐ Pseudohypoparathyroidism
- ☐ Cranial diabetes insipidus

Dr Assem

Psychogenic polydipsia	11%
Nephrogenic diabetes insipidus	25%
Primary hyperparathyroidism	2%
Pseudohypoparathyroidism	3%
Cranial diabetes insipidus	59%

A dramatic improvement is seen in the ability of the kidneys to concentrate urine following the administration of DDAVP. This points towards a diagnosis of cranial diabetes insipidus

A woman presents to the emergency department with confusion. She is found to be hypothermic with a low blood pressure and bradycardic. After further examination and investigation, she is found to be in a myxoedemic coma.

What is the most appropriate first-line treatment for this ladies presentation?

- ☐ Adrenaline and levothyroxine
- ☐ Prednisolone and levothyroxine
- ☐ Hydrocortisone and levothyroxine
- ☐ Hydrocortisone and fludrocortisone
- ☐ Adrenaline and hydrocortisone

Adrenaline and levothyroxine

9%

Prednisolone and levothyroxine

8%

Hydrocortisone and levothyroxine

65%

Hydrocortisone and fludrocortisone

7%

Adrenaline and hydrocortisone

11%

Myxoedemic coma is treated with thyroxine and hydrocortisone

Important for me Less important

This question is asking about a woman presenting with confusion, bradycardia, hypotension who has been diagnosed with a myxoedemic coma. It is asking for the first initial treatment, thus the correct answer is hydrocortisone and levothyroxine.

Levothyroxine is used to replace the low levels of thyroid hormone causing the patient's symptoms.

Hydrocortisone is given to treat adrenal insufficiency. Patients suffering from a myxoedemic coma due to secondary hypothyroidism are at risk of hypopituitarism due to the location of the lesion. Thus patients are treated as presumed adrenal insufficiency until it has been ruled out.

Dr. Arsen

Which one of the following features is least associated with primary hyperparathyroidism?

- ☐ Depression
- ☐ Polydipsia
- ☐ Sensory loss
- ☐ Peptic ulceration
- ☐ Hypertension

Depression

6%

Polydipsia

7%

Sensory loss

54%

Peptic ulceration

13%

Hypertension

21%

A 85-year-old male presents to clinic for a review of his overactive bladder. Non-pharmacologic treatments have so far failed to improve his symptoms. Which of the following pharmacotherapies represents the most appropriate initial management step?

- ☐ Finasteride
- ☐ Desmopressin
- ☐ Tamsulosin
- ☐ Mirabegron
- ☐ Tolterodine



NICE (Feb 2015) outlines treatment steps for the management of overactive bladder symptoms in men.

If non-pharmacologic measures fail, an anticholinergic agent is first line. In older men, tolterodine is preferred to oxybutynin as the latter has a greater risk of causing confusion.

If anticholinergics fail or are contraindicated, mirabegron may be trialled. Its mechanism of action is via beta-adrenoreceptor-mediated relaxation of the bladder wall.

Tamsulosin is an alpha-blocker and indicated if the patient has obstructive symptoms, rather than symptoms of overactive bladder.

Finasteride is a 5-alpha reductase inhibitor and indicated if the patient has obstructive symptoms and an enlarged prostate with a high risk of progression.

Desmopressin is a synthetic vasopressin analogue that acts in the collecting duct of the nephron. It is sometimes used off-label for nocturnal urinary incontinence.

You are on the post-take ward round reviewing a 55-year-old lady who has been admitted with her third urinary tract infection in as many months. Of note she is a type II diabetic patient and was commenced on empagliflozin by her GP four months ago. You suspect recurrent urinary tract infections secondary to her empagliflozin, a sodium glucose co-transporter 2 inhibitor used in the treatment of type 2 diabetes mellitus. Where is its main site of action?

- ☐ Early distal convoluted tubule
- ☐ Collecting duct
- ☐ Early proximal convoluted tubule
- ☐ Late proximal convoluted tubule
- ☐ Late distal convoluted tubule

Early distal convoluted tubule	12%
Collecting duct	10%
Early proximal convoluted tubule	53%
Late proximal convoluted tubule	14%
Late distal convoluted tubule	11%

In the normal kidney up to 180 grams/ day of glucose is filtered by the renal glomerulus and virtually all of it is reabsorbed in the proximal convoluted tubule. This reabsorption is carried out by two sodium-dependent glucose co-transporter (SGLT) proteins, SGLT1, which reabsorbs 10%, and SGLT2, which reabsorbs the remaining 90%. While SGLT1 is expressed elsewhere in the body, SGLT2 is expressed solely in the kidney, making it an attractive target for novel diabetic treatments.

To date a number of SGLT2 inhibitors have been developed. These agents have been shown to enhance renal glucose excretion by inhibiting renal glucose reabsorption with consequent improvements in HbA1C and insulin resistance. Furthermore, they have been shown to have protective effects in the progression of chronic kidney disease, blood pressure lowering effects and reduce cardiovascular events in high risk type II diabetic patients. To date they are the only oral hypoglycaemic agent to demonstrate any benefit on macrovascular outcomes in type II diabetic patients.

Important side effects to be aware of with this class of drug are genital tract infections and euglycaemic diabetic ketoacidosis.

Which one of the following statements regarding dipeptidyl peptidase-4 inhibitors in the management of type 2 diabetes mellitus is correct?

- ☐ Metformin should always be co-prescribed
- ☐ Do not cause weight gain
- ☐ Is given via a subcutaneous injection
- ☐ An example is exenatide
- ☐ Patients should be warned that hypoglycaemia is the most common side-effect

Metformin should always be co-prescribed

10%

Do not cause weight gain

60%

Is given via a subcutaneous injection

9%

An example is exenatide

9%

Patients should be warned that hypoglycaemia is the most common side-effect

13%

Hypoglycaemia is rare in patients taking dipeptidyl peptidase-4 inhibitors.

Dr Assem

A 29-year-female, who is 4 months post-partum, presents with a 3-week history of weight loss, heat intolerance, tremor, palpitation and diarrhoea. Pregnancy and birth were uncomplicated. On further questioning, she admits having taken off-license weight loss medication bought from the internet 1 month ago. Past medical history and family history are insignificant. She does not smoke or drink alcohol.

On physical examination, she has exophthalmos, brisk reflexes and fine tremor. Her vital signs were heart rate 98/minute, blood pressure 136/76 mmHg, temperature 36.5°C. The thyroid gland was diffusely enlarged.

Thyroid Stimulating Hormone (TSH)	0.02 mU/l
Free thyroxine (T4)	24 pmol/l
Total thyroxine (T4)	150 nmol/l

What is the most likely diagnosis?

- ☐ Exogenous thyroxine
- ☐ Graves' Disease
- ☐ Hashimoto's thyroiditis
- ☐ Post-partum thyroiditis
- ☐ De Quervain's thyroiditis

Exogenous thyroxine	29%
Graves' Disease	42%
Hashimoto's thyroiditis	3%
Post-partum thyroiditis	23%
De Quervain's thyroiditis	3%

Graves' disease may present first or become worse during the post-natal period

Important for me Less important

This is a case of hyperthyroidism due to Graves' disease. Graves' disease may manifest itself or worsen during pregnancy and the post-natal period.

Exophthalmos is a specific sign seen in Graves' disease and not in other hyperthyroid conditions.

Hashimoto's thyroiditis leads to hypothyroidism.

In post-partum thyroiditis, the woman initially develops hyperthyroidism immediately after birth followed by normal or sometimes decreased thyroid levels.

De Quervain's thyroiditis can present with pain and dysphagia and may lead to high, normal or low thyroid levels.

A 72-year-old woman presents with polyuria and polydipsia. Investigations reveal the following:

Fasting glucose	4.5 mmol/l
Calcium	2.88 mmol/l
Phosphate	0.75 mmol/l
Parathyroid hormone	6 pmol/L (normal range = 0.8 - 8.5)

What is the most likely underlying diagnosis?

- ☐ Myeloma
- ☐ Sarcoidosis
- ☐ Primary hyperparathyroidism
- ☐ Vitamin D excess
- ☐ Osteomalacia

Myeloma	16%
Sarcoidosis	8%
Primary hyperparathyroidism	57%
Vitamin D excess	12%
Osteomalacia	7%

The PTH level in primary hyperparathyroidism may be normal

Important for me Less important

Despite a raised calcium level the parathyroid hormone level is inappropriately normal. This points towards a diagnosis of primary hyperparathyroidism and the other causes (such as myeloma) would lead to a suppression of parathyroid hormone

A 58-year-old man comes for review in the diabetes clinic. He was diagnosed as having type 2 diabetes mellitus (T2DM) around 10 years ago and currently only takes gliclazide and atorvastatin. Three years ago he was successfully treated for bladder cancer. A recent trial of metformin was unsuccessful due to gastrointestinal side-effects. He works as an accountant, is a non-smoker and his BMI is 31 kg/m². His annual bloods show the following:

Na ⁺	138 mmol/l
K ⁺	4.1 mmol/l
Urea	4.3 mmol/l
Creatinine	104 µmol/l
HbA1c	62 mmol/mol (7.8%)

What is the most appropriate next step in management?

- ☐ Add pioglitazone
- ☐ Add exenatide
- ☐ Add acarbose
- ☐ Add repaglinide
- ☐ Add sitagliptin

Add pioglitazone	15%
Add exenatide	21%
Add acarbose	4%
Add repaglinide	4%
Add sitagliptin	55%

Pioglitazone is contraindicated by his history of bladder cancer and may contribute to his obesity. A DPP-4 inhibitor such as sitagliptin is therefore the best option.

Exenatide generally causes weight loss and is therefore useful in obese diabetics but he does not meet the NICE body mass index criteria of 35 kg/m^2 .

A 64-year-old patient is prescribed pegvisomant for the treatment of acromegaly. What is the mechanism of action of pegvisomant?

- ☐ IGF-1 receptor antagonist
- ☐ Growth hormone receptor antagonist
- ☐ IGF-1 receptor agonist
- ☐ Growth hormone receptor agonist
- ☐ Long-acting somatostatin analogue

IGF-1 receptor antagonist

22%

Growth hormone receptor antagonist

53%

IGF-1 receptor agonist

6%

Growth hormone receptor agonist

6%

Long-acting somatostatin analogue

14%

Which one of the following is most likely to be seen in a patient with multiple endocrine neoplasia (MEN) type I?

- ☐ Phaeochromocytoma
- ☐ Insulinoma
- ☐ Marfanoid body habitus
- ☐ Medullary thyroid carcinoma
- ☐ RET gene

Phaeochromocytoma

24%

Insulinoma

50%

Marfanoid body habitus

3%

Medullary thyroid carcinoma

15%

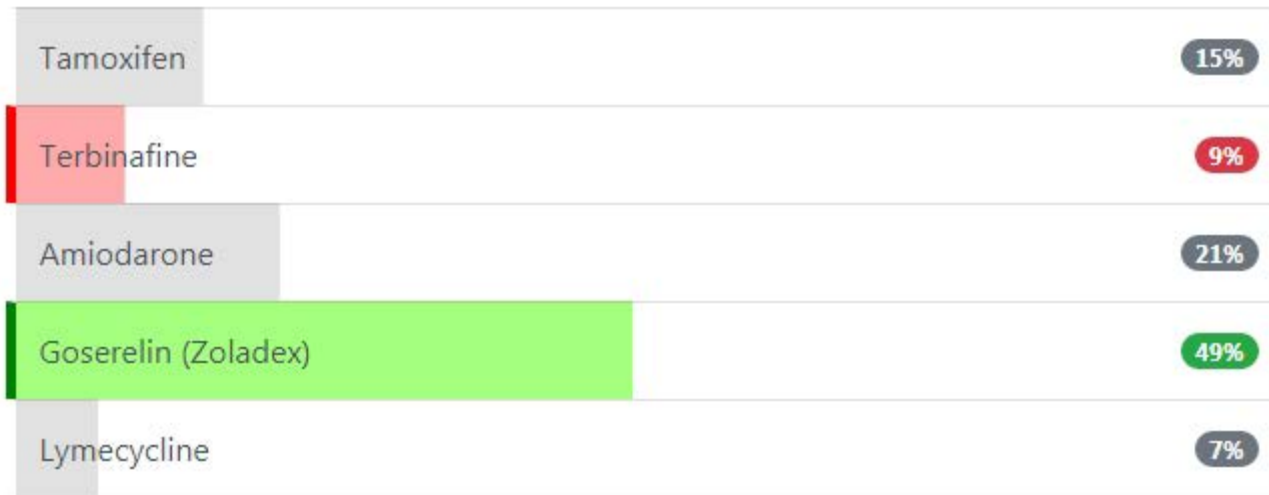
RET gene

7%

Dr Assem

You review a 70-year-old who has a long past medical history and is on multiple drugs. He has developed excessive amounts of breast tissue bilaterally. Which one of the following drugs is most likely to be responsible?

- ☐ Tamoxifen
- ☐ Terbinafine
- ☐ Amiodarone
- ☐ Goserelin (Zoladex)
- ☐ Lyme cycline



Goserelin is a gonadorelin analogue used in the treatment of advanced prostate cancer.
Tamoxifen may be used to treat gynaecomastia.

A General Practitioner refers a 45-year-old female patient to the endocrinology department with hypercalcaemia and raised parathyroid hormone levels. Her blood tests are highly suggestive of primary hyperparathyroidism. Her past medical history includes type 2 diabetes, which is well controlled on metformin alone.

Which feature would be the strongest indication for referral of the patient for consideration of parathyroid surgery?

- ☐ Co-existing type 2 diabetes
- ☐ Post menopausal patient
- ☐ Persistent hypercalcaemia over 4 years
- ☐ Vitamin D deficiency
- ☐ Age of 45

Co-existing type 2 diabetes	7%
Post menopausal patient	12%
Persistent hypercalcaemia over 4 years	37%
Vitamin D deficiency	9%
Age of 45	34%

NICE guidelines clearly stipulate the circumstances under which parathyroidectomy should be considered in primary hyperparathyroidism. These are listed below:

- Age under 50 years.
- Adjusted serum calcium concentration that is 0.25 mmol/L or more above the upper end of the reference range.
- Estimated glomerular filtration rate (eGFR) less than 60 mL/min/1.73 m² although this threshold depends on other factors, such as age.
- Renal stones or presence of nephrocalcinosis on ultrasound or CT.
- Presence of osteoporosis or osteoporotic fracture.
- Symptomatic disease

From the potential answers offered, the patient's age under 50 is the only answer that meets the NICE criteria.

(Source: NICE guidelines, hyperparathyroidism - <http://cks.nice.org.uk/hypercalcaemia>)

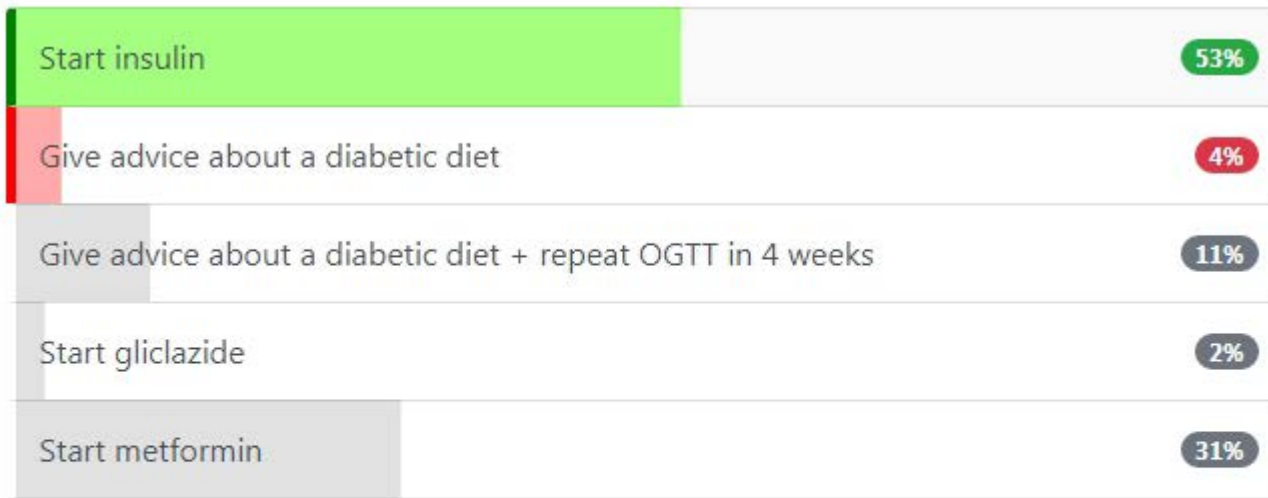
Dr. Assem

A 25-year-old Asian woman who is 26 weeks pregnant has an oral glucose tolerance test (OGTT). This was requested due to a combination of her ethnicity and a background of obesity. A recent ultrasound shows that the fetus is large for dates. The following results are obtained:

Time (hours)	Blood glucose (mmol/l)
0	9.2
2	14.2

What is the most appropriate management?

- ☐ Start insulin
- ☐ Give advice about a diabetic diet
- ☐ Give advice about a diabetic diet + repeat OGTT in 4 weeks
- ☐ Start gliclazide
- ☐ Start metformin



Insulin should be started straight away given the blood glucose levels and evidence of macrosomia. Aspirin should also be considered as she is at increased risk of pre-eclampsia.

A 45-year-old female is reviewed in the medical clinic with a two month history of lethargy. Blood tests reveal the following:

Na ⁺	129 mmol/l
K ⁺	5.1 mmol/l
Urea	5.3 mmol/l
Creatinine	99 µmol/l
Total T4	66 nmol/l

Which one of the following investigations is most likely to reveal the diagnosis?

- ☐ Serum glucose
- ☐ TSH
- ☐ Free T4
- ☐ Overnight dexamethasone suppression test
- ☐ Short synacthen test

Serum glucose

5%

TSH

14%

Free T4

2%

Overnight dexamethasone suppression test

18%

Short synacthen test

61%

The short synacthen test is the best test to diagnose Addison's disease

Important for me [Less important](#)

Hyponatraemia and a high potassium in a patient with lethargy is highly suggestive of Addison's disease. The thyroxine level is slightly low and she may indeed have co-existing hypothyroidism but this would not explain the high potassium

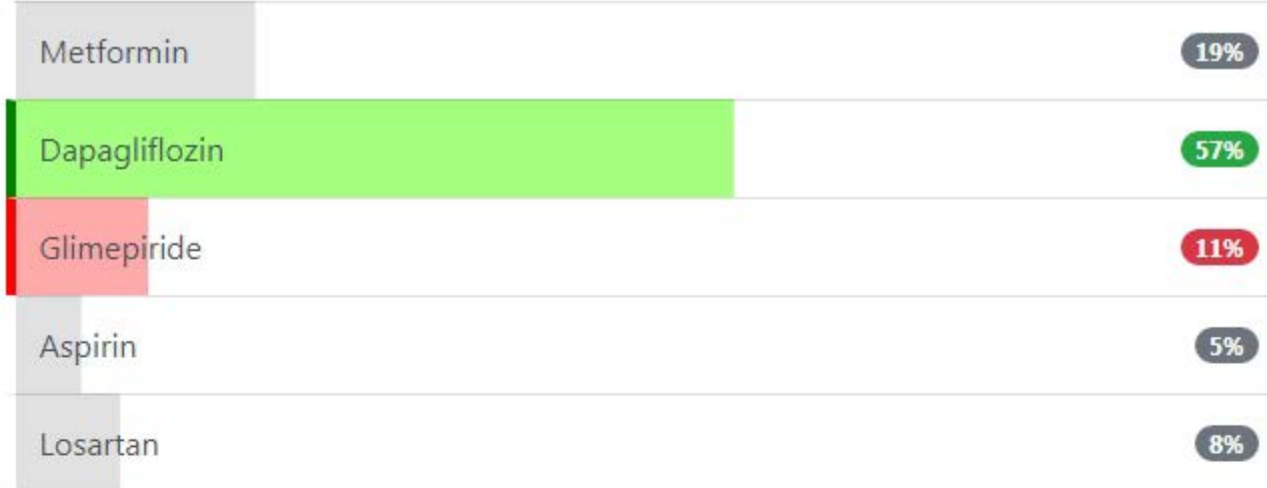
Many labs have an upper reference range for potassium of 5.5 mmol/l, but in the context of the other results hypoadrenalism should be suspected

A 58-year-old gentleman with longstanding type 2 diabetes presents to the acute medical take. Blood tests are demonstrated in the table below. The blood test results are consistent with diabetic ketoacidosis. He has no other past medical history other than type 2 diabetes and obesity. He has not had episodes of diabetic ketoacidosis before and does not drink alcohol. His medication history includes aspirin, losartan, metformin, dapagliflozin and glimepiride. He is allergic to penicillin.

pH	7.26
Blood ketones	3.6 mmol/L
Blood sugar	15 mmol/L

Which of his medications is most likely to have contributed to developing diabetic ketoacidosis?

- ☐ Metformin
- ☐ Dapagliflozin
- ☐ Glimepiride
- ☐ Aspirin
- ☐ Losartan



Dapagliflozin is a newer drug for the treatment of diabetes. It is a member of the sodium-glucose transport protein 2 (SGLT2) inhibitor class of drugs.

SGLT2 inhibitors prevent the resorption of glucose from the proximal renal tubule, resulting in more glucose being secreted in the urine.

The other medications in this class include: canagliflozin & empagliflozin

Importantly, whilst these medications represent an effective class of drugs, there are reports of patients with type 2 diabetes presenting in diabetic ketoacidosis whilst taking them. It is essential that acute medical teams are vigilant for such presentations as the prevalence of SGLT2 inhibitor prescribing increases.

The other possible answers (metformin / glimepiride / aspirin / losartan) are not associated with the development of diabetic ketoacidosis. It should, of course, be noted that metformin can lead to a lactic acidosis.

Source: UK Government Drug Safety Bulletin (<https://www.gov.uk/drug-safety-update/sglt2-inhibitors-updated-advice-on-the-risk-of-diabetic-ketoacidosis>)

Dr Assem

A 43-year-old man is admitted to hospital with pneumonia. His past medical history includes Addison's disease for which he takes hydrocortisone (20mg in the mornings and 10mg in the afternoon). What is the most appropriate action with respect to his steroid dose?

- ☐ Continue to take the same dose
- ☐ Double hydrocortisone to 40mg mornings and 20mg afternoon
- ☐ Halve hydrocortisone to 10mg mornings and 5mg afternoon
- ☐ Continue to take the same dose + prescribe a proton pump inhibitor
- ☐ Continue the same morning dose + stop the afternoon dose

Continue to take the same dose

7%

Double hydrocortisone to 40mg mornings and 20mg afternoon

77%

Halve hydrocortisone to 10mg mornings and 5mg afternoon

7%

Continue to take the same dose + prescribe a proton pump inhibitor

5%

Continue the same morning dose + stop the afternoon dose

4%

Patients on long-term steroids should have their doses doubled during intercurrent illness

Important for me Less important

A 27-year-old man is reviewed in a fertility clinic. Semen analysis has revealed azoospermia. On examination at the previous appointment he was noted to be 1.83 metres tall with a body mass index of 25 kg / m^2 . A degree of gynaecomastia is noted, testicular volume is around 10ml bilaterally and his visual fields were normal. Which investigation is likely to be diagnostic?

- ☐ FISH analysis of DNA
- ☐ Prolactin level
- ☐ Karyotype
- ☐ MRI pituitary
- ☐ PCR analysis of DNA

FISH analysis of DNA

8%

Prolactin level

8%

Karyotype

75%

MRI pituitary

6%

PCR analysis of DNA

3%

Klinefelter's? - do a karyotype

Important for me Less important

A 54-year-old man with type 2 diabetes mellitus is started on exenatide. Which one of the following statements regarding exenatide is **incorrect**?

- ☐ Typically results in weight loss
- ☐ May be combined with a sulfonylurea
- ☐ The major adverse effect is flu-like symptoms
- ☐ May be combined with metformin
- ☐ Must be given by subcutaneous injection

Typically results in weight loss

13%

May be combined with a sulfonylurea

18%

The major adverse effect is flu-like symptoms

47%

May be combined with metformin

7%

Must be given by subcutaneous injection

15%

Exenatide causes vomiting

Important for me Less important

The major adverse effect is nausea and vomiting

Dr Assem

A 29-year-old woman has just found out she is pregnant for the second time. Her first pregnancy was complicated by gestational diabetes. Following her first pregnancy she was told she was no longer diabetic. What is the most appropriate management?

- ☐ Check HbA1c immediately
- ☐ Start metformin and ask the woman to self-monitor glucose
- ☐ Do oral glucose tolerance test as soon as possible after booking
- ☐ Do oral glucose tolerance test at 16-18 weeks
- ☐ Do oral glucose tolerance test at 24-28 weeks

Check HbA1c immediately

6%

Start metformin and ask the woman to self-monitor glucose

5%

Do oral glucose tolerance test as soon as possible after booking

47%

Do oral glucose tolerance test at 16-18 weeks

26%

Do oral glucose tolerance test at 24-28 weeks

16%

NICE have recently updated their guidelines. Women who are at risk of gestational diabetes should have an oral glucose tolerance test as soon as possible after booking, rather than waiting to 16-18 weeks as was previously advocated.

A 50 year-old woman presents with polyuria and polydipsia. She has recently been started on citalopram for depression, but is otherwise fit and well. She has complained of constipation recently, but has put this down to her new medication.

Calcium	2.8mmol/l
Phosphate	0.7mmol/l
Parathyroid hormone	5.0pmol/l (1.2-5.8pmol/l)

Renal function and full blood count are normal.

What is the most likely cause for these blood results?

- ☐ Parathyroid adenoma
- ☐ Myeloma
- ☐ Metastatic cancer
- ☐ Drug induced
- ☐ Parathyroid hyperplasia

Parathyroid adenoma

47%

Myeloma

6%

Metastatic cancer

4%

Drug induced

22%

Parathyroid hyperplasia

21%

The PTH level in primary hyperparathyroidism may be normal

Important for me Less important

This woman has signs and symptoms of hypercalcaemia. Her parathyroid hormone should be suppressed in the presence of hypercalcaemia. Given that it is normal (inappropriately), this indicates the parathyroid as the cause for the hypercalcaemia. The most common cause of hyperparathyroidism is an adenoma.

A 64-year-old man with a history of type 2 diabetes comes to the clinic for review. His HbA1c is elevated at 64 mmol/mol despite taking 1g of metformin BD. On examination his blood pressure is 142/88 mmHg, his pulse is 82 beats per minute and regular. His body mass index is elevated at 33 kg/m². A decision is made to start him on dapagliflozin. Which of the following would you expect on starting therapy?

- ☐ Hypoglycaemia
- ☐ Increased blood pressure
- ☐ Increased serum urate
- ☐ Increased total cholesterol
- ☐ Weight gain

Hypoglycaemia

26%

Increased blood pressure

7%

Increased serum urate

19%

Increased total cholesterol

24%

Weight gain

23%

SGLT-2 inhibitors like dapagliflozin promote increased glucose excretion because they inhibit glucose reabsorption in the kidney. This corresponds to a calorie load of 200-400 kcal per day. In some patients, this results in dramatic weight loss, although on average this equates to 1-2% reduction in weight over 6 months. SGLT-2 inhibitors are recognised to increase total cholesterol, (both HDL and LDL), although cardiovascular outcome studies as yet do not suggest this translates into increased risk of MACE events. In fact, the EMPA-reg study with empagliflozin demonstrated a reduction in overall mortality.

Hypoglycaemia is not a feature of SGLT2 inhibitor use and SGLT-2 inhibitors are associated with increased urate excretion rather than an increase in serum uric acid.

<https://www.evidence.nhs.uk/formulary/bnf/current/6-endocrine-system/61-drugs-used-in-diabetes/612-antidiabetic-drugs/6123-other-antidiabetic-drugs/dapagliflozin>

<http://www.nejm.org/doi/full/10.1056/NEJMoa1504720#t=article>

A 41-year-old woman presents with palpitations and heat intolerance. On examination her pulse is 90/min and a small, diffuse goitre is noted which is tender to touch. Thyroid function tests show the following:

Free T4	24 pmol/l
TSH	< 0.05 mu/l

What is the most likely diagnosis?

- ☐ Grave's disease
- ☐ Sick thyroid syndrome
- ☐ De Quervain's thyroiditis
- ☐ Hashimoto's thyroiditis
- ☐ Toxic multinodular goitre

Grave's disease	20%
Sick thyroid syndrome	4%
De Quervain's thyroiditis	61%
Hashimoto's thyroiditis	7%
Toxic multinodular goitre	9%

Thyrotoxicosis with tender goitre = subacute (De Quervain's) thyroiditis

Important for me Less important

Whilst Grave's disease is the most common cause of thyrotoxicosis it would not cause a tender goitre. In the context of thyrotoxicosis this finding is only really seen in De Quervain's thyroiditis.

Hashimoto's thyroiditis is an autoimmune disorder of the thyroid gland. It is typically associated with hypothyroidism although there may be a transient thyrotoxicosis in the acute phase. The goitre is non-tender in Hashimoto's.

A 24-year-old female with a history of type 1 diabetes mellitus presents to the Emergency Department with vomiting and abdominal pain. Finger-prick testing estimates the blood sugar to be 25 mmol/l. Arterial blood gases record a pH of 7.22. On examination the patient is dehydrated and weighs 80 kg. An intravenous line is sited and bloods are sent. One litre of 0.9% saline is infused and an intravenous insulin pump is set-up. What rate should insulin be initially given?

- ☐ 10 unit / hour
- ☐ 1 unit / hour
- ☐ 2 unit / hour
- ☐ 6 unit / hour
- ☐ 8 unit / hour

10 unit / hour

9%

1 unit / hour

12%

2 unit / hour

5%

6 unit / hour

15%

8 unit / hour

60%

The Joint British Diabetes Societies produced guidelines in 2010 recommending starting the insulin infusion at a rate of 0.1 unit/kg/hour.

A 6-year-old South Sudanese boy is admitted progressive worsening of his hearing loss. His mother is extremely concerned with his lack of progress at school. Systems review reveals a 2-month history of malaise, arthralgia and constipation. He has a past medical history of deafness. On examination he has dry skin and thin hair; there were no thyroid eye signs, no ophthalmoplegia and no myxoedema. He appears to have a smooth symmetrically enlarged goitre, which is not painful.

Thyroid function tests:

Thyroid stimulating hormone	5.7 (mu/l)
Free T4	9 pmol/l
Total T4	67 nmol/l

Which of the following causes of hypothyroidism is the patient suffering from?

- ☐ Hashimoto's thyroiditis
 - ☐ Iodine deficiency
 - ☐ Pendred syndrome
 - ☐ Thyroid agenesis
 - ☐ Atrophic hypothyroidism
- Dr Assem



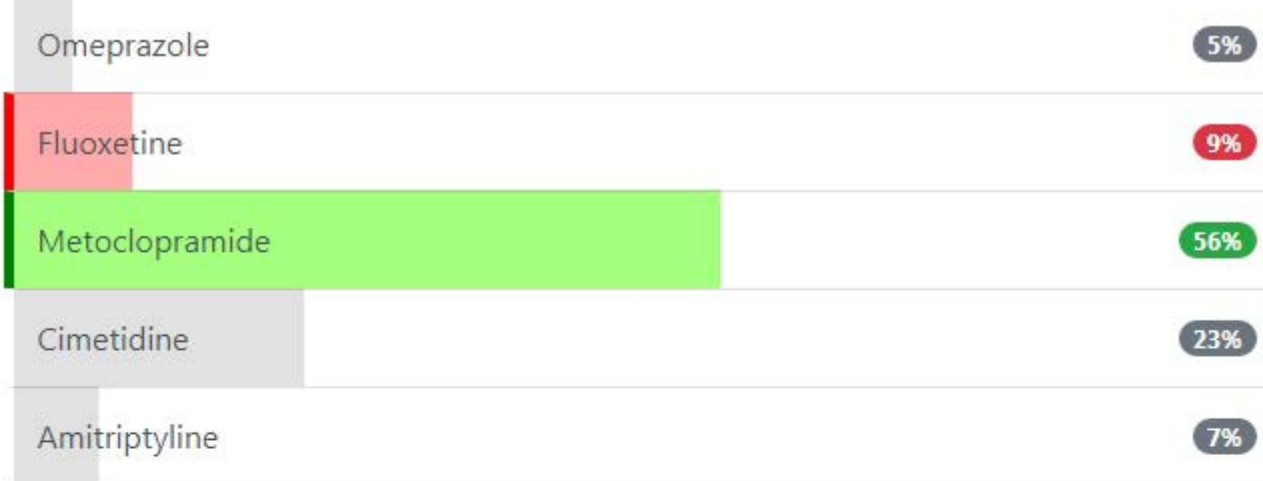
The patient is suffering from mild signs of hypothyroidism and progressive bilateral deafness. Out of the following answers only Pendred syndrome presents with signs of deafness and hypothyroidism.

A 45-year-old man with a history of depression and gastro-oesophageal reflux disease presents due to a milky discharge from his nipples. The following blood results are obtained:

Prolactin	700 mu/l
-----------	----------

Which one of his medications is most likely to be responsible?

- ☐ Omeprazole
- ☐ Fluoxetine
- ☐ Metoclopramide
- ☐ Cimetidine
- ☐ Amitriptyline



Causes of raised **p**rolactin - the **p**'s

- **p**regnancy
- **p**rolactinoma
- **p**hysiological
- **p**olycystic ovarian syndrome
- **p**rimary hypothyroidism
- **p**henothiazines, metoclo**p**ramide, dom**p**eridone

Important for me Less important

Selective serotonin reuptake inhibitors such as fluoxetine have rarely been associated with hyperprolactinaemia but the most likely cause in this patient is metoclopramide. Cimetidine is generally associated with gynaecomastia, rather than galactorrhoea.

A 27-year-old female develops eye pain and reduced visual acuity following the initiation of treatment for her recently diagnosed Grave's disease. Which one of the following treatments is likely to have been started?

- ☐ Radioiodine treatment
- ☐ Thyroidectomy
- ☐ Propylthiouracil
- ☐ Carbimazole and thyroxine
- ☐ Carbimazole

Radioiodine treatment

69%

Thyroidectomy

3%

Propylthiouracil

11%

Carbimazole and thyroxine

4%

Carbimazole

13%

Radioiodine treatment may lead to the development / worsening of thyroid eye disease in up to 15% of patients with Grave's disease

In patients with suspected insulinoma, which one of the following is considered the best investigation?

- ☐ Oral glucose tolerance test
- ☐ Insulin tolerance test
- ☐ Early morning C-peptide levels
- ☐ Glucagon stimulation test
- ☐ Supervised fasting

Oral glucose tolerance test

3%

Insulin tolerance test

5%

Early morning C-peptide levels

28%

Glucagon stimulation test

4%

Supervised fasting

60%

Insulinoma is diagnosed with supervised prolonged fasting

Important for me

Less important

CT of the pancreas is also useful in demonstrating a lesion

A 50-year-old female complains that she has put on weight around her abdomen and thighs in the last six months. She has a past medical history of hypertension, high cholesterol, type II diabetes and asthma. She has not changed her diet or lifestyle during the last six months. Which of her medications may be contributing to her weight gain?

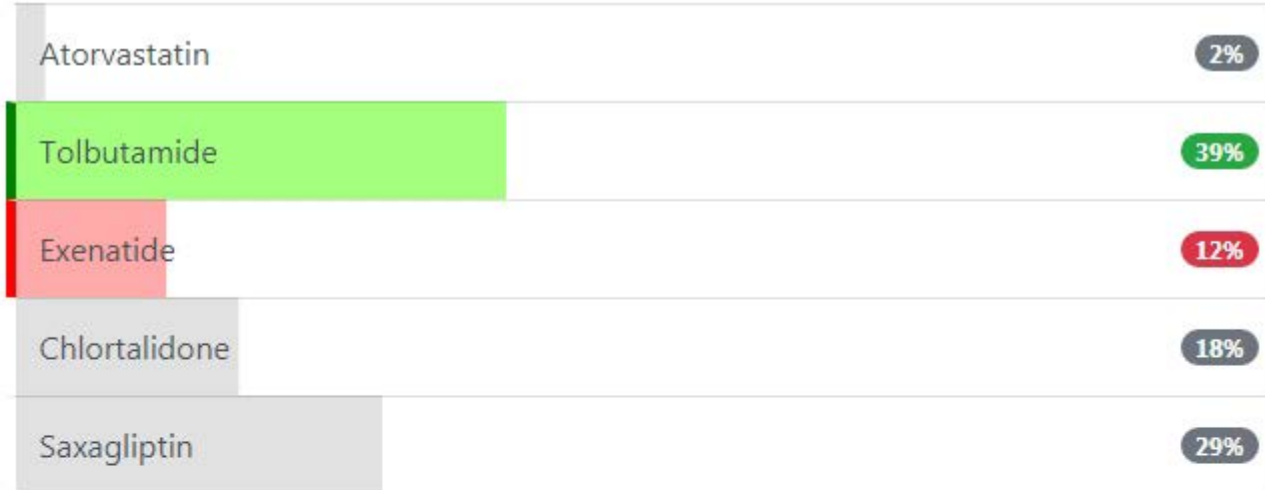
☐ Atorvastatin

☐ Tolbutamide

☐ Exenatide

☐ Chlortalidone

☐ Saxagliptin



Sulfonylureas often cause weight gain

Important for me Less important

The correct answer is 2. Tolbutamide is a member of the sulfonylurea class, which are known to often cause weight gain because they stimulate the pancreas to release more insulin, therefore allowing for the utilisation of more glucose. The gliptins are not associated with weight gain.

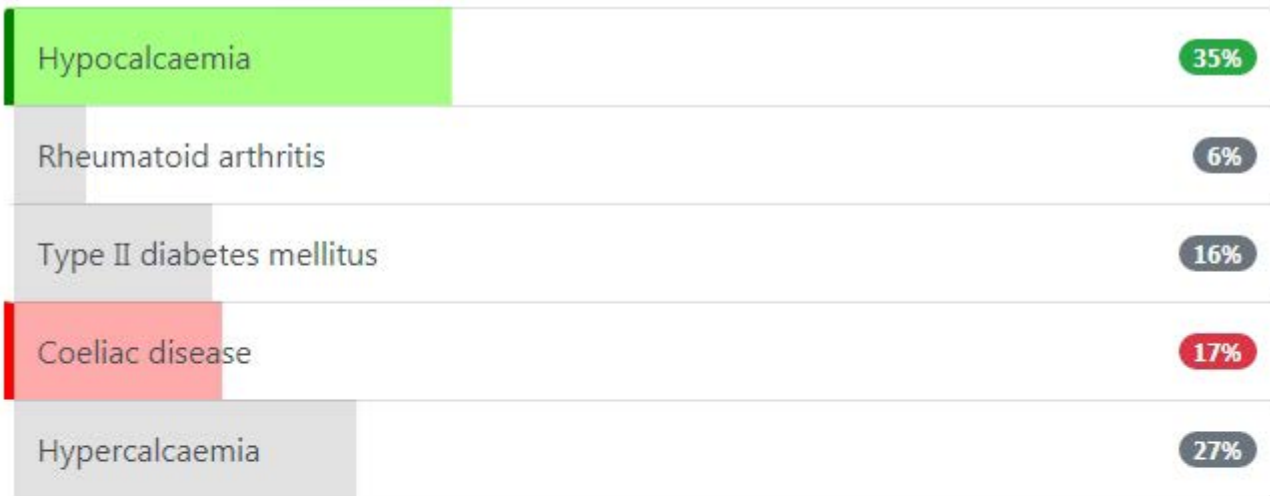
BNF

<https://bnf.nice.org.uk/treatment-summary/type-2-diabetes.html>

Dr Assem

A 22-year-old female presents with recurrent painful oral ulceration. Examination reveals signs of oral *Candidal* infection. Which one of the following would most suggest type 1 polyglandular syndrome?

- ☐ Hypocalcaemia
- ☐ Rheumatoid arthritis
- ☐ Type II diabetes mellitus
- ☐ Coeliac disease
- ☐ Hypercalcaemia



Primary hypoparathyroidism is usually the first endocrine manifestation of type 1 autoimmune polyendocrinopathy syndrome. The contrast to multiple endocrine neoplasia (MEN), where hyperparathyroidism is a common finding, should be noted

The question gives a slightly atypical history as this is the upper end of the age range in which patients would be expected to present

Which one of the following regarding the management of thyroid problems during pregnancy is **incorrect**?

- ☐ Maternal free thyroxine levels should be kept in the upper third of the normal reference range when treating thyrotoxicosis
- ☐ Increased levels of thyroxine-binding globulin are seen in pregnancy
- ☐ Block-and-replace is preferable in pregnancy compared to antithyroid drug titration
- ☐ Breast feeding is safe whilst on thyroxine
- ☐ Untreated thyrotoxicosis increases the risk of premature labour

Maternal free thyroxine levels should be kept in the upper third of the normal reference range when treating thyrotoxicosis

14%

Increased levels of thyroxine-binding globulin are seen in pregnancy

9%

Block-and-replace is preferable in pregnancy compared to antithyroid drug titration

60%

Breast feeding is safe whilst on thyroxine

9%

Untreated thyrotoxicosis increases the risk of premature labour

8%

A 56-year-old Muslim man with a history of type 2 diabetes asks for advice. He is due to start fasting for Ramadan soon and is unsure what he should do with regards to his diabetes medications. He currently takes metformin 500mg tds. What is the most appropriate advice?

- ☐ Switch to subcutaneous biphasic insulin for the duration of Ramadan
- ☐ 500 mg at the predawn meal + 1000 mg at the sunset meal
- ☐ No change to the metformin dose
- ☐ 1000 mg at the predawn meal + 500 mg at the sunset meal
- ☐ Stop metformin for the duration of Ramadan

Switch to subcutaneous biphasic insulin for the duration of Ramadan

5%

500 mg at the predawn meal + 1000 mg at the sunset meal

59%

No change to the metformin dose

16%

1000 mg at the predawn meal + 500 mg at the sunset meal

17%

Stop metformin for the duration of Ramadan

3%

During Ramadan, one-third of the normal metformin dose should be taken before sunrise and two-thirds should be taken after sunset

Important for me Less important

Please see the Diabetes Care link for more details.

A 67-year-old woman presents with lethargy, depression and constipation. A set of screening blood tests reveals the following:

Calcium	3.05 mmol/l
Albumin	41 g/l

What is the single most useful test for determining the cause of her hypercalcaemia?

- ☐ ESR
- ☐ Phosphate
- ☐ Vitamin D level
- ☐ Parathyroid hormone
- ☐ ACE level

ESR	3%
Phosphate	7%
Vitamin D level	6%
Parathyroid hormone	81%
ACE level	3%

Parathyroid hormone levels are useful as malignancy and primary hyperparathyroidism are the two most common causes of hypercalcaemia. A parathyroid hormone that is normal or raised suggests primary hyperparathyroidism.

A 56-year-old man is reviewed in the Cardiology outpatient clinic following a myocardial infarction one year previously. During his admission he was found to be hypertensive and diabetic. He complains that he has put on 5kg in weight in the past 6 months. Which of his medications may be contributing to his weight gain?

- ☐ Metformin
- ☐ Losartan
- ☐ Clopidogrel
- ☐ Gliclazide
- ☐ Simvastatin

Metformin

7%

Losartan

3%

Clopidogrel

2%

Gliclazide

87%

Simvastatin

2%

Sulfonylureas often cause weight gain

Important for me Less important

A 57-year-old woman is referred to urogynaecology with symptoms of urge incontinence. A trial of bladder retraining is unsuccessful. It is therefore decided to use a muscarinic antagonist.

Which one of the following medications is an example of a muscarinic antagonist?

- ☐ Tolterodine
- ☐ Teriparatide
- ☐ Toremifene
- ☐ Finasteride
- ☐ Tamsulosin



Other examples of muscarinic antagonists used in urinary incontinence include oxybutynin and solifenacin. Examples of muscarinic antagonists used in different conditions include ipratropium (chronic obstructive pulmonary disease) and procyclidine (Parkinson's disease).

Tamsulosin is an alpha blocker.

Dr Assem

A 41-year-old woman is investigated for hot flushes and night sweats. Bloods show a significantly raised FSH level and her symptoms are attributed to the menopause. Following discussions with the patient she elects to have hormone replacement treatment. What is the most significant risk of prescribing an oestrogen-only preparation rather than a combined oestrogen-progestogen preparation?

- ☐ Increased risk of venous thromboembolism
- ☐ Increased risk of ovarian cancer
- ☐ Increased risk of endometrial cancer
- ☐ Increased risk of breast cancer
- ☐ Increased risk of colorectal cancer

Increased risk of venous thromboembolism

14%

Increased risk of ovarian cancer

6%

Increased risk of endometrial cancer

52%

Increased risk of breast cancer

25%

Increased risk of colorectal cancer

2%

HRT: unopposed oestrogen increases risk of endometrial cancer

Important for me Less important

A 33-year-old female is referred to endocrinology with thyrotoxicosis. Following a discussion of management options she elects to have radioiodine therapy. Which one of the following is the most likely adverse effect?

- ☐ Hypothyroidism
- ☐ Thyroid malignancy
- ☐ Agranulocytosis
- ☐ Oesophagitis
- ☐ Precipitation of thyroid eye disease

Hypothyroidism

53%

Thyroid malignancy

4%

Agranulocytosis

7%

Oesophagitis

4%

Precipitation of thyroid eye disease

33%

It is well documented that radioiodine therapy can precipitate thyroid eye disease but a majority of patients will eventually require thyroxine replacement

A 33-year-old woman is referred to the endocrinology clinic with thyrotoxicosis. Recent blood tests show the following:

TSH	< 0.05 mu/l
Free T4	25 pmol/l
Anti-thyroid peroxidase antibodies	115 IU/mL (< 35 IU/mL)

A smooth, non-tender goitre is noted on examination the neck. The patient also has exophthalmos although there is no ophthalmoplegia, no reduction in visual acuity and no eye symptoms present.

What is the most appropriate management?

- ☐ Radioiodine treatment
- ☐ Carbimazole
- ☐ Propranolol
- ☐ Fine needle aspiration biopsy of the thyroid gland
- ☐ Intravenous corticosteroids

Radioiodine treatment	13%
Carbimazole	69%
Propranolol	6%
Fine needle aspiration biopsy of the thyroid gland	5%
Intravenous corticosteroids	7%

This patient has Graves' disease as evidenced by the thyrotoxicosis, goitre, thyroid eye disease and anti-thyroid peroxidase antibodies.

Radioiodine treatment should be avoided given the presence of thyroid eye disease so carbimazole is a better treatment option.

If her eye disease was severe then an ophthalmologist should be consulted. Options for severe thyroid eye disease include systemic steroids and radiotherapy.

A 72-year-old man is reviewed in the diabetes clinic. He has a history of heart failure and type 2 diabetes mellitus. His current medications include furosemide 40mg od, ramipril 10mg od and bisoprolol 5mg od. Clinical examination is unremarkable with no evidence of peripheral oedema, a clear chest and blood pressure of 130/76 mmHg. Recent renal and liver function tests are normal. Which one of the following medications is contraindicated?

- ☐ Sitagliptin
- ☐ Pioglitazone
- ☐ Gliclazide
- ☐ Exenatide
- ☐ Metformin

Sitagliptin

4%

Pioglitazone

84%

Gliclazide

4%

Exenatide

4%

Metformin

3%

Pioglitazone - contraindicated by: heart failure

Important for me Less important

Thiazolidinediones are absolutely contraindicated in heart failure

Dr Assem

Which one of the following is most likely to be found in a patient with Hashimoto's thyroiditis?

- ☐ Raised ESR
- ☐ Anti-TSH receptor stimulating antibodies
- ☐ Anti-thyroid peroxidase antibodies
- ☐ Decreased TSH
- ☐ Co-existing type 2 diabetes mellitus

Raised ESR

8%

Anti-TSH receptor stimulating antibodies

11%

Anti-thyroid peroxidase antibodies

73%

Decreased TSH

3%

Co-existing type 2 diabetes mellitus

4%

Hashimoto's thyroiditis = hypothyroidism + goitre + anti-TPO

Important for me Less important

Which one of the following drugs used in the management of type 2 diabetes mellitus has the Medicines and Healthcare products Regulatory Agency warned is associated with an increased risk of severe pancreatitis and renal impairment?

☐ Rosiglitazone

☐ Metformin

☐ Acarbose

☐ Exenatide

☐ Sitagliptin

Rosiglitazone

22%

Metformin

9%

Acarbose

11%

Exenatide

43%

Sitagliptin

15%

A 51-year-old woman is reviewed in the diabetes clinic. She was diagnosed with type 2 diabetes mellitus 12 months ago and still has poor glycaemic control (63 mmol/mol). She has recently had to stop taking gliclazide due to repeated episodes of hypoglycaemia and is only taking maximum dose metformin. Her BMI is 26 kg/m². What is the most appropriate next step in management?

- ☐ Add either pioglitazone, a DPP-4 inhibitor or a SGLT-2 inhibitor
- ☐ Refer her for a laparoscopic gastric band
- ☐ Refer her for insulin therapy
- ☐ Add either a thiazolidinedione or exenatide
- ☐ Add either a DPP-4 inhibitor or exenatide

Add either pioglitazone, a DPP-4 inhibitor or a SGLT-2 inhibitor

71%

Refer her for a laparoscopic gastric band

1%

Refer her for insulin therapy

4%

Add either a thiazolidinedione or exenatide

5%

Add either a DPP-4 inhibitor or exenatide

19%

A 55-year-old type 1 diabetic is referred to the endocrine clinic with erratic blood sugars. She had previously been inadequately controlled due to poor compliance with medication, however, for the last few years has been relatively stable on a mixture of long and short acting insulin. Her last HBA1c was 57mmol/l. For around 3 months she has been experiencing unpredictable hypoglycaemic episodes, alternating with very high readings, despite being cautious with her carbohydrate counting. She reports episodes of bloating and has vomited on a number of occasions. She has no other symptoms to report. On review of her blood sugar diary, there is no obvious pattern to her hypoglycaemic events and no trigger can be identified.

What is the most appropriate management?

- ☐ Increase dose of long acting insulin
- ☐ Trial of metoclopramide
- ☐ Reduce dose of short acting insulin
- ☐ Continue current treatment
- ☐ Trial of domperidone

Submit answer

A 22-year-old man is investigated for weight loss and diarrhoea. A rectal biopsy is taken and reported as follows:

Deep inflammatory infiltrate from the mucosa to the muscularis propria
Numerous granulomata noted

What is the most likely diagnosis?

- ☐ Crohn's disease
- ☐ Rectal carcinoma-in-situ
- ☐ Tuberculosis
- ☐ Laxative abuse
- ☐ Ulcerative colitis



Condition	Percentage
Crohn's disease	73%
Rectal carcinoma-in-situ	2%
Tuberculosis	4%
Laxative abuse	4%
Ulcerative colitis	17%

Crohn's disease

73%

Rectal carcinoma-in-situ

2%

Tuberculosis

4%

Laxative abuse

4%

Ulcerative colitis

17%

Inflammation in ulcerative colitis is usually limited to the mucosa and submucosa.

Which one of the following is not associated with oesophageal cancer?

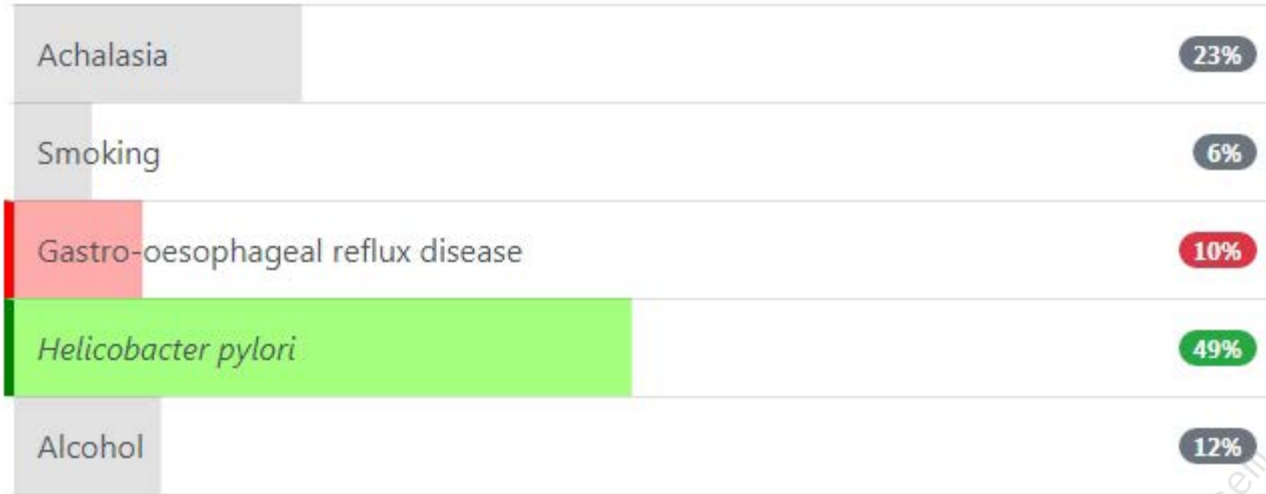
☐ Achalasia

☐ Smoking

☐ Gastro-oesophageal reflux disease

☐ *Helicobacter pylori*

☐ Alcohol



Helicobacter pylori may actually be protective against oesophageal cancer

A 34-year-old man with a background of polycythaemia rubra vera presented with a 2-day history of sudden onset worsening abdominal pain. On examination of his abdomen, there was tenderness on palpation to his right upper quadrant with moderate shifting dullness and the liver edge was present 2cm below the right costal margin.

Given the likely diagnosis, what is the most sensitive first line investigation?

- ☐ Ultrasound with doppler flow
- ☐ CT liver with triple phase
- ☐ MRI liver with contrast
- ☐ Contrast-enhanced CT abdomen
- ☐ Hepatic vein venography

Ultrasound with doppler flow

46%

CT liver with triple phase

14%

MRI liver with contrast

7%

Contrast-enhanced CT abdomen

14%

Hepatic vein venography

19%

Budd–Chiari syndrome - ultrasound with Doppler flow studies is very sensitive and should be the initial radiological investigation

Important for me Less Important

This patient has most likely presented here with Budd-Chiari syndrome. In this situation, an ultrasound with doppler flow studies is highly sensitive and should, therefore, be the first radiological investigation. It will exhibit the absence of blood flow in the hepatic vein or flow reversal and even the thrombus itself.

The contrast-enhanced CT scan would be able to visualise the presence of patchy enhancement of the liver tissue and post-hepatic inferior vena cava (IVC) may be absent. The caudate liver lobe is often enlarged and pre-hepatic dilatation of the IVC is seen but the thrombus itself can be shown in less than 50% of patients. Splenomegaly with ascites would also be seen.

The role of MRI in diagnosing Budd–Chiari syndrome is still up and coming. It is able to detect blood flow or its absence within the hepatic vein or IVC.

Hepatic vein venography could help identify the thrombus and further demonstrate a web as a cause of the obstruction. It would also be able to distinctly visualise intrahepatic collaterals.

A 59-year-old woman presents with dysphagia. There is no history of heartburn, weight loss or change in bowel habit. During endoscopy there is some difficulty passing through the lower oesophageal sphincter but no other abnormality is noted. Which one of the following tests is most likely to reveal the diagnosis?

- ☐ Oesophageal biopsy
- ☐ Oesophageal manometry
- ☐ Plain chest x-ray
- ☐ Endoscopy ultrasound
- ☐ CT thorax

Oesophageal biopsy

7%

Oesophageal manometry

77%

Plain chest x-ray

5%

Endoscopy ultrasound

5%

CT thorax

6%

The gold standard test for achalasia is oesophageal manometry

Important for me

Less important

A 62-year-old man is called for review after a positive faecal occult blood test done as part of the national screening programme. During counselling for colonoscopy he asks what percentage of patients with a positive faecal occult blood test have colorectal cancer. What is the most accurate answer?

☐ 0.5 - 2%

☐ 5 - 15%

☐ 20 - 30%

☐ 30 - 50%

☐ 55 - 75%

0.5 - 2%

15%

5 - 15%

51%

20 - 30%

16%

30 - 50%

13%

55 - 75%

6%

Colorectal cancer screening - PPV of FOB = 5 - 15%

Important for me Less important

There is also a 30-45% chance of having an adenoma with a positive faecal occult blood test

A 28-year-old man undergoes an ileocaecal resection to treat terminal ileal Crohns disease. Post operatively he attends the clinic and complains of diarrhoea. His CRP is within normal limits and small bowel enteroclysis shows no focal changes. Which of the following interventions is most likely to be beneficial?

- ☐ 5 ASA drugs
- ☐ Azathioprine
- ☐ Pulsed methylprednisolone
- ☐ Infliximab
- ☐ Oral cholestyramine

5 ASA drugs

17%

Azathioprine

14%

Pulsed methylprednisolone

10%

Infliximab

9%

Oral cholestyramine

50%

Malabsorption of bile salts is a common cause of diarrhoea following ileal resection. A normal small bowel study and CRP effectively excludes active Crohns disease and therefore immunomodulator drugs are not appropriate.

A 43-year-old woman presents to the emergency department with confusion, distended abdomen and jaundice. She describes a heavy cough, fever and malaise for three days following a period of heavy drinking. She is known to have cirrhosis secondary to alcoholic liver disease. On examination, she is jaundiced, confused and has tense ascites, and there are audible crackles in the right side of her chest. She also has distended veins on her abdomen and a palpable liver.

Blood tests:

Hb	94 g/l
MCV	104 fl
Platelets	$92 \times 10^9/l$
WBC	$12.5 \times 10^9/l$
Neutrophils	$8.4 \times 10^9/l$
Na ⁺	148 mmol/l
K ⁺	5.1 mmol/l
Urea	6.2 mmol/l
Creatinine	122 μ mol/l
Bilirubin	34 μ mol/l
ALP	245 u/l
ALT	276 u/l
γ GT	321 u/l
Albumin	21 g/l
Prothrombin time	18 s

Which of these abnormalities is attributable chronic excessive alcohol use without being secondary to liver decompensation?

- ☐ Macrocytic anaemia
- ☐ Neutrophilia
- ☐ Thrombocytopenia
- ☐ Deranged clotting
- ☐ Hypoalbuminaemia



The correct answer is macrocytic anaemia. Macrocytosis is common in patients with alcoholism, often preceding anaemia. It can be independent of vitamin deficiency and the mechanism is not completely understood. Reduced hepatic synthetic function causes reduced production of clotting factors leading to deranged clotting, and similarly a failure in production of albumin. Alcohol is also directly toxic to platelets, and associated splenomegaly in portal hypertension can cause thrombocytopenia, but reduced hepatic function of thrombopoietin can cause low platelets. The neutrophilia is likely secondary to an acute chest infection.

A 69-year-old woman was evaluated following the development of a rash on her lower limbs for the last two weeks, worsening breathlessness and weight loss. This eruption started as a small erythematous annular patch, slowly enlarging into polycyclic patches with a wood-grain appearance over the lateral aspects of her left thigh. The patient had a background of atrial fibrillation on warfarin and hypothyroidism on levothyroxine. She has 45 pack year history of smoking with underlying COPD managed with regular inhalers and home nebulisers. She complained of losing 10kg in weight over the last six months. Her symptoms were not being managed using her inhalers and nebulisers.

Based on the history and clinical findings, what is the correct diagnosis?

- ☐ Erythema annulare centrifugum
- ☐ Mycosis fungoides
- ☐ Erythema chronicum migrans
- ☐ Erythema gyratum repens
- ☐ Tinea corporis

Erythema annulare centrifugum	26%
Mycosis fungoides	11%
Erythema chronicum migrans	22%
Erythema gyratum repens	33%
Tinea corporis	8%

Erythema gyratum repens is a paraneoplastic eruption with a 'wood-grain' pattern and figurate erythema commonly seen in patients with lung cancer

Important for me Less important

Erythema gyratum repens - associated with internal malignancies - is characterised by a number of concentric, erythematous, from either flat to slightly raised bands with fine white scale in waves located at the leading edge of erythema. Their appearance may represent a wood-grain pattern. It can often precede a diagnosis of typically lung cancer by an average of nine months.

Erythema annulare centrifugum is defined by the presence of expanding, erythematous annular lesions. Its cause is unknown but likely due to drugs, insect bites, food & infections.

Mycosis fungoides is a form of cutaneous T-cell lymphoma characterised by itchy, erythematous scattered patches and plaques.

Erythema chronicum migrans is the classical rash caused by Lyme disease following a tick bite. It starts off as a red macule/papule developing into an expanding patch of erythema with a classic bull's eye appearance.

Tinea corporis is a superficial fungal ringworm infection.

Dr Assem

A 64-year-old female with a history of COPD and hypertension presents with pain on swallowing. Current medication includes a salbutamol and beclomethasone inhaler, bendroflumethiazide and amlodipine. What is the most likely cause of the presentation?

- ☐ Myasthenia gravis precipitated by bendroflumethiazide
- ☐ Oesophageal web
- ☐ Achalasia secondary to amlodipine
- ☐ Oesophageal candidiasis
- ☐ Oesophageal cancer

Myasthenia gravis precipitated by bendroflumethiazide

3%

Oesophageal web

6%

Achalasia secondary to amlodipine

7%

Oesophageal candidiasis

80%

Oesophageal cancer

4%

Pain on swallowing (odynophagia) is a typical of oesophageal candidiasis, a well documented complication of inhaled steroid therapy

Which of the following skin conditions associated with malignancy are not correctly paired?

- ☐ Necrolytic migratory erythema and glucagonoma
- ☐ Migratory thrombophlebitis and pancreatic cancer
- ☐ Erythema gyratum repens and lymphoma
- ☐ Acanthosis nigricans and gastrointestinal cancer
- ☐ Erythroderma and lymphoma

Necrolytic migratory erythema and glucagonoma

11%

Migratory thrombophlebitis and pancreatic cancer

11%

Erythema gyratum repens and lymphoma

54%

Acanthosis nigricans and gastrointestinal cancer

11%

Erythroderma and lymphoma

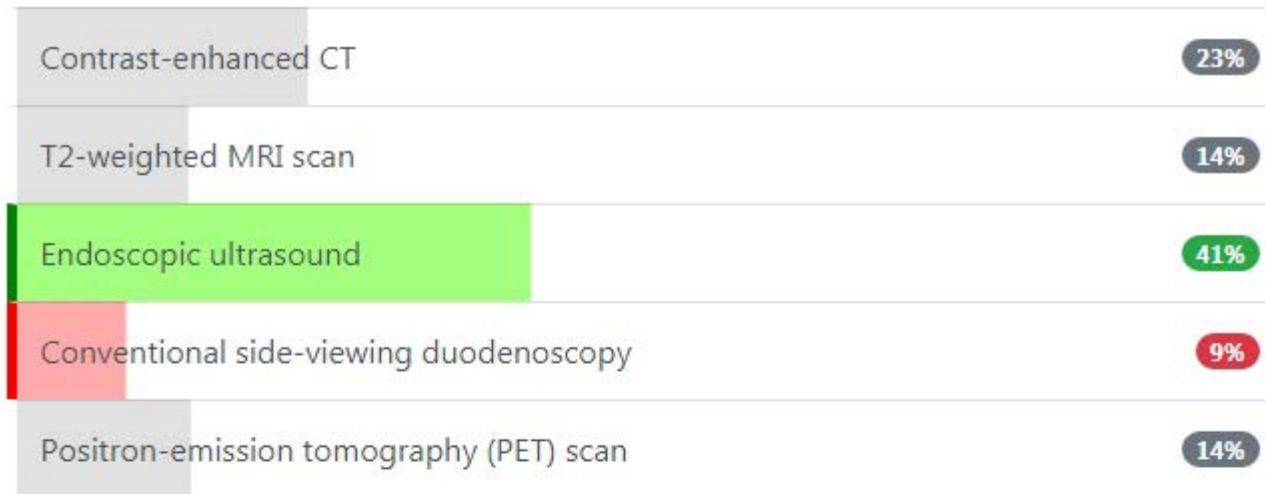
13%

Erythema gyratum repens is generally associated with solid organ malignancies such as lung and breast cancer

A 59-year-old woman presented with painful dysphagia, poor appetite and weight loss over the past nine months. She is a heavy chain smoker with a 30 pack year history. She admits to consuming alcohol excessively. An urgent barium swallow was arranged and shows the presence of a suspicious malignant oesophageal stricture.

What is the best investigation to assess for mural invasion?

- ☐ Contrast-enhanced CT
- ☐ T2-weighted MRI scan
- ☐ Endoscopic ultrasound
- ☐ Conventional side-viewing duodenoscopy
- ☐ Positron-emission tomography (PET) scan



Oesophageal/Gastric Cancer - Endoscopic ultrasound (EUS) is better than CT or MRI in assessing mural invasion

Important for me Less important

The endoscopic ultrasound aids the visualisation of local invasion as it can display all the layers of the wall of the oesophagus and should routinely be performed with CT or MRI scans.

Overall, endoscopic ultrasound is far superior to CT or MRI when assessing mural invasion.

The positron-emission tomography (PET) scan is increasingly being employed by oncologists in detecting and following up the tumour progression.

Duodenoscopes are essentially specialised endoscopes that are used primarily for endoscopic retrograde cholangiopancreatography (ERCP). They are side-viewing (rather than forward-viewing) endoscopes that have an advantage in being able to view the major duodenal papilla.

A 72-year-old woman is reviewed following a course of oral flucloxacillin for right lower limb cellulitis. The local protocol suggests oral clindamycin should be used next-line. Which one of the following side-effects of clindamycin is it most important to warn her about?

- ☐ Heartburn or indigestion
- ☐ Jaundice
- ☐ Sore throat, bruising or lethargy
- ☐ Avoid any food or drink containing alcohol
- ☐ Diarrhoea

Heartburn or indigestion

6%

Jaundice

10%

Sore throat, bruising or lethargy

4%

Avoid any food or drink containing alcohol

6%

Diarrhoea

73%

Clindamycin treatment is associated with a high risk of *Clostridium difficile*

Important for me Less important

A 45-year woman who you have treated for obesity comes for review. Despite ongoing lifestyle interventions and trials of orlistat and sibutramine she has failed to lose a significant amount of weight. She is currently taking ramipril for hypertension but a recent fasting glucose was normal. For this patient, what is the cut-off body mass index (BMI) that would trigger a referral for consideration of bariatric surgery?

☐ BMI > 35 kg/m²

☐ BMI > 40 kg/m²

☐ BMI > 30 kg/m²

☐ BMI > 38 kg/m²

☐ BMI > 45 kg/m²

BMI > 35 kg/m²

48%

BMI > 40 kg/m²

30%

BMI > 30 kg/m²

8%

BMI > 38 kg/m²

8%

BMI > 45 kg/m²

6%

Obesity - NICE bariatric referral cut-offs

- with risk factors (T2DM, BP etc): > 35 kg/m²
- no risk factors: > 40 kg/m²

Important for me Less important

A 39-year-old man with a history of alcohol excess presents to the Emergency Department with a 2 day history of severe epigastric pain. His amylase is found to be 1260. What is the best marker of severity?

- ☐ CRP
- ☐ Amylase (on admission)
- ☐ Pain scores
- ☐ Lipase (on admission)
- ☐ Number of similar previous admissions

CRP	44%
Amylase (on admission)	13%
Pain scores	6%
Lipase (on admission)	29%
Number of similar previous admissions	8%

CRP is now a widely used marker of severity in acute pancreatitis. Other methods which have to correlate with prognosis include the Ranson criteria and APACHE II score (Acute Physiology And Chronic Health Evaluation)

Which one of the following is most associated with the development of acute pancreatitis?

- ☐ Hyperchylomicronaemia
- ☐ Amyloidosis
- ☐ Hypogammaglobulinaemia
- ☐ Hypercholesterolaemia
- ☐ Hypotriglyceridaemia

Hyperchylomicronaemia

45%

Amyloidosis

6%

Hypogammaglobulinaemia

7%

Hypercholesterolaemia

26%

Hypotriglyceridaemia

16%

Hyperchylomicronaemia may be caused by hereditary lipoprotein lipase deficiency and apolipoprotein CII deficiency. It predisposes to recurrent attacks of acute pancreatitis

A 36-year-old woman presents with flushing, diarrhoea and abdominal discomfort. She says these symptoms have come on over the last few months and do not appear to be getting better. You decide to run some tests. 24-hour urine 5-HIAA is elevated confirming your diagnosis of carcinoid syndrome. A scan is undertaken which localises the neoplastic lesion to the jejunum. You start her on octreotide to calm her symptoms whilst she awaits surgery. What cardiac abnormalities are associated with this conditions?

- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Acquired ventricular septal defect
- ☐ Pulmonary stenosis and tricuspid insufficiency
- ☐ Aortic dissection
- ☐ Löffler endocarditis

Hypertrophic obstructive cardiomyopathy

13%

Acquired ventricular septal defect

4%

Pulmonary stenosis and tricuspid insufficiency

54%

Aortic dissection

12%

Löffler endocarditis

17%

Carcinoid syndrome can affect the right side of the heart. The valvular effects are tricuspid insufficiency and pulmonary stenosis

Important for me Less important

Carcinoid syndrome is a neuroendocrine tumour. There are many locations that they can occur in such as in the GI tract, in the respiratory tract and many other places. They can secrete serotonin which leads to many of the symptoms this patient suffers. The syndrome is associated with right-sided valvular pathology. The most common pathology is tricuspid insufficiency and pulmonary stenosis. The best way to remember is the acronym 'TIPS'.

HOCM is associated with inherited gene defects on the β -myosin heavy chain. This is not associated with carcinoid syndrome.

Acquired VSD would be associated with an MI and not carcinoid syndrome.

Aortic dissection is associated with hypertension and connective tissue disorder.

Löffler endocarditis is endocarditis due to eosinophil proliferation in the heart. It is associated with helminthic infections and not carcinoid syndrome.

A 71-year-old man presents with two year history of intermittent problems with swallowing. His wife has also noticed he has halitosis and is coughing at night. He has a past medical history of type 2 diabetes mellitus but states he is otherwise well. Of note his weight is stable and he has a good appetite. Clinical examination is unremarkable. What is the most likely diagnosis?

- ☐ Oesophageal cancer
- ☐ Hiatus hernia
- ☐ Pharyngeal pouch
- ☐ Oesophageal candidiasis
- ☐ Benign oesophageal stricture

Oesophageal cancer

3%

Hiatus hernia

7%

Pharyngeal pouch

77%

Oesophageal candidiasis

9%

Benign oesophageal stricture

4%

Given the two year history and good health oesophageal cancer is much less likely

A 44-year-old man with alcoholic liver disease is admitted with pyrexia. He has been unwell for the past three days and has multiple previous admissions before with variceal bleeding. Examination shows multiple stigmata of chronic liver disease, ascites and jaundice. Paracentesis is performed with the following results:

Neutrophils	487 cells/ul
-------------	--------------

What is the most appropriate treatment?

- ☐ Therapeutic abdominal washout
- ☐ Intravenous vancomycin + metronidazole
- ☐ Intravenous cefotaxime
- ☐ Insert an ascitic drain
- ☐ Intravenous ciprofloxacin

Therapeutic abdominal washout

4%

Intravenous vancomycin + metronidazole

17%

Intravenous cefotaxime

59%

Insert an ascitic drain

7%

Intravenous ciprofloxacin

13%

Spontaneous bacterial peritonitis - treatment: intravenous cefotaxime

Important for me Less important

Please see the British Society of Gastroenterology guidelines for more details.

A 29-year-old woman who is 30 weeks pregnant is admitted to the Emergency Department with central abdominal pain. Initial blood tests show the following:

Amylase	1,438 u/dl
---------	------------

What is the most likely cause of this presentation?

- ☐ Gestational diabetes
- ☐ HELLP syndrome
- ☐ Gallstones-induced pancreatitis
- ☐ Hypertriglyceridaemia-induced pancreatitis
- ☐ Pre-eclampsia

Gestational diabetes	3%
HELLP syndrome	8%
Gallstones-induced pancreatitis	64%
Hypertriglyceridaemia-induced pancreatitis	22%
Pre-eclampsia	4%

Pancreatitis occurs in around 1 in 2,000 pregnancies. Most cases of pancreatitis in pregnancy are gallstone related.

A 46-year-old, with an end-stage chronic kidney disease secondary to diabetes, undertakes a renal transplantation with no immediate complications. Two months later, he attends the emergency department with a 3-day history of a febrile syndrome and right upper quadrant pain. Investigations showed a moderated leukopenia and mild transaminasaemia.

Hb	119 g/l
Platelets	$234 \times 10^9/l$
WBC	$2.46 \times 10^9/l$

ALP	61 u/l
ALT	75 u/l
γ GT	72 u/l
Albumin	38 g/l

What would be your first diagnostic impression?

- ☐ *Pneumocystis jirovecii* infection
- ☐ *Varicella-zoster virus* infection
- ☐ Renal tuberculosis
- ☐ *Cytomegalovirus* infection
- ☐ Hepatitis B

<i>Pneumocystis jirovecii</i>	infection	6%
<i>Varicella-zoster virus</i>	infection	3%
Renal tuberculosis		2%
<i>Cytomegalovirus</i>	infection	78%
Hepatitis B		10%

CMV infection is one of the most important in transplant receptors - clinically is characterized by fever, deranged transaminases, leukopenia and thrombocytopenia. Diagnosed by PCR and treated with ganciclovir

Important for me Less important

Cytomegalovirus infection is one of the most important opportunist infections in transplant receptors. Usually happens between the first month after transplant and the sixth month. Clinically is characterized by fever, deranged transaminases, leukopenia and thrombocytopenia. It is diagnosed by polymerase chain reaction (pcr) and treated with Ganciclovir.

Pneumocystis jirovecii can also cause an opportunist infection, such as pneumonia, particularly among immunocompromised hosts.

Varicella-zoster virus can cause primo-infection or reinfection affecting one or multiple dermatomes over skin and mucosas, characterized by a skin rash that forms small, itchy blisters, which eventually scab over. It can also affect vital organs causing, for instance, pulmonary varicella.

Renal tuberculosis accounts for 15-20% of extra-pulmonary tuberculosis and can result in varied and striking radiographic appearances and often presents with pyuria in the absence of common bacterial infection (ordinary urine cultures persistently negative).

Finally, hepatitis B is not an opportunist infection and can present with a variety of symptoms depending on how acute or subacute the infection is - clinically characterized by hyperbilirubinaemia, extremely elevated transaminases and general malaise.

A 51-year-old woman is investigated for lethargy and pruritus. Her appetite is normal and she has not lost weight. On examination she is not clinically jaundiced and there is no organomegaly. Bloods tests are reported as follows:

Hb	12.8 g/dl
Platelets	$188 \times 10^9/l$
WBC	$6.7 \times 10^9/l$

Na ⁺	140 mmol/l
K ⁺	3.9 mmol/l
Urea	6.2 mmol/l
Creatinine	68 μ mol/l

Bilirubin	30 μ mol/l
ALP	231 u/l
ALT	38 u/l
γ GT	367 u/l
Albumin	39 g/l

What further test is most likely to reveal the diagnosis?

☐ Anti-nuclear antibodies

☐ Liver ultrasound

☐ Anti-mitochondrial antibodies

☐ Ceruloplasmin

☐ Ferritin

Anti-nuclear antibodies

9%

Liver ultrasound

17%

Anti-mitochondrial antibodies

65%

Ceruloplasmin

5%

Ferritin

5%

Primary biliary cholangitis - the **M** rule

- Ig**M**
- anti-**M**itochondrial antibodies, **M**2 subtype
- **M**iddle aged females

Important for me Less important

The demographic (middle-aged female), history (lethargy, pruritus) and liver function tests (rise in ALP and γ GT) all point to a diagnosis of primary biliary cirrhosis (PBC). Anti-mitochondrial antibodies are found in 98% of patients with PBC.

A 39-year-old man with a history of liver cirrhosis secondary to alcohol excess is admitted with an upper gastrointestinal haemorrhage. He is treated with terlipressin and has an endoscopy with variceal band ligation 6 hours following admission. Which further intervention has been shown to reduce mortality during the acute admission?

- ☐ IV labetalol to induce hypotension for the first 3 days
- ☐ Low-molecular weight heparin prophylaxis
- ☐ Nasogastric tube feeding for the first 3 days
- ☐ Antibiotic prophylaxis
- ☐ High-dose proton pump inhibitor therapy

IV labetalol to induce hypotension for the first 3 days

10%

Low-molecular weight heparin prophylaxis

5%

Nasogastric tube feeding for the first 3 days

4%

Antibiotic prophylaxis

53%

High-dose proton pump inhibitor therapy

28%

Antibiotic prophylaxis reduces mortality in cirrhotic patients with gastrointestinal bleeding

Important for me Less important

A 27-year-old man with multiple pigmented freckles on his lips and face is investigated for iron-deficiency anaemia. A diagnosis of Peutz-Jeghers syndrome is suspected. What is the mode of inheritance?

- ☐ Autosomal recessive
- ☐ Mitochondrial inheritance
- ☐ X-linked dominant
- ☐ Autosomal dominant
- ☐ X-linked recessive

Autosomal recessive

25%

Mitochondrial inheritance

3%

X-linked dominant

3%

Autosomal dominant

64%

X-linked recessive

5%

Peutz-Jeghers syndrome - autosomal dominant

Important for me

Less important

A 20-year-old female with known Crohn's disease presents in gastroenterology clinic for review of her management. She is currently being treated with oral prednisolone. She has experienced 3 mild flare ups of her Crohn's disease in the past 12 months, each occurring when oral steroid dose has been tapered. You consider adding azathioprine to her management.

Which of the following should be assessed before commencing azathioprine in this patient?

- ☐ Liver function
- ☐ Thiopurine methyltransferase (TPMT) activity
- ☐ Body mass index (BMI)
- ☐ Renal function
- ☐ Coagulation

Liver function

20%

Thiopurine methyltransferase (TPMT) activity

69%

Body mass index (BMI)

3%

Renal function

5%

Coagulation

3%

TPMT activity should be assessed before offering azathioprine or mercaptopurine therapy in Crohn's disease

Important for me Less important

Thiopurine methyltransferase (TPMT) is an enzyme involved in the metabolism of azathioprine and mercaptopurine. Some people have a deficiency of TPMT due to genetic mutations, and these people are at a greater risk of experiencing severe side effects from conventional doses of azathioprine or mercaptopurine. TPMT activity should therefore be assessed before offering azathioprine or mercaptopurine therapy. Such medications should not be commenced if TPMT is very low or absent. If TPMT activity is below normal, but not deficient, azathioprine or mercaptopurine can be commenced at a lower dose.

Which one of the following adverse effects is least associated with sulfasalazine?

- ☐ Male infertility
- ☐ Skin rashes
- ☐ Visual disturbance
- ☐ Diarrhoea
- ☐ Agranulocytosis

Male infertility

23%

Skin rashes

4%

Visual disturbance

41%

Diarrhoea

17%

Agranulocytosis

16%

A 30-year-old woman is admitted to hospital with abdominal pain and diarrhoea. She has no past medical history other than depression for which she takes citalopram. She smokes 20 cigarettes/day and drinks 20 units of alcohol per week. Ileocolonoscopy shows features consistent with Crohn's disease and she is treated successfully with glucocorticoid therapy. Which one of the following is the most important intervention to reduce the chance of further episodes?

- ☐ Infliximab
- ☐ Stop drinking
- ☐ Stop smoking
- ☐ Mesalazine
- ☐ Budesonide

Infliximab

5%

Stop drinking

6%

Stop smoking

75%

Mesalazine

12%

Budesonide

3%

A 22-year-old male with a history of familial adenomatous polyposis (FAP) has a total colectomy. What is the mode of inheritance of FAP?

- ☐ Uniparental disomy of chromosome 12
- ☐ Autosomal recessive
- ☐ Uniparental disomy of chromosome 14
- ☐ Autosomal dominant
- ☐ X-linked recessive

Uniparental disomy of chromosome 12

4%

Autosomal recessive

14%

Uniparental disomy of chromosome 14

3%

Autosomal dominant

74%

X-linked recessive

5%

A 45-year-old obese man with a history of type 2 diabetes mellitus is reviewed in clinic. He is well and asymptomatic. His recent annual blood tests have shown slightly abnormal liver function tests:

Bilirubin	20 $\mu\text{mol/l}$
ALP	104 u/l
ALT	53 u/l
γGT	58 u/l
Albumin	38 g/l

A follow-up liver ultrasound is reported as showing fatty changes. Other standard liver screen bloods, including viral serology, are normal. His alcoholic intake is within recommended limits.

What is the most appropriate next test to perform?

- ☐ Endoscopic ultrasound (EUS)
- ☐ Enhanced liver fibrosis blood test
- ☐ Repeat liver ultrasound after calorific restricted diet for 1 month
- ☐ Liver biopsy
- ☐ High-sensitivity C-reactive protein

Endoscopic ultrasound (EUS)

8%

Enhanced liver fibrosis blood test

50%

Repeat liver ultrasound after calorific restricted diet for 1 month

30%

Liver biopsy

9%

High-sensitivity C-reactive protein

4%

In patients with non-alcoholic fatty liver disease, enhanced liver fibrosis (ELF) testing is recommended to aid diagnosis of liver fibrosis

Important for me Less important

This is a typical patient who has non-alcoholic fatty liver disease - obese and with type 2 diabetes mellitus.

NICE recommend that if NAFLD is found incidentally then an enhanced liver fibrosis (ELF) blood test should be performed to assess for more severe liver disease.

A 62-year-old man presents with painless jaundice and is diagnosed with pancreatic cancer undergoes pancreaticoduodenectomy. He recovers well from surgery. He is referred to oncology for further management and is started on palliative adjuvant chemotherapy. Two months later he presents with a recurrence of painless jaundice. Apart from routine blood tests and serum cancer antigen 19-9, how should he be investigated?

- ☐ Magnetic resonance cholangiopancreatography (MRCP)
- ☐ Endoscopic resonance cholangiopancreatography (ERCP)
- ☐ US abdomen
- ☐ Abdominal X-ray
- ☐ CT scan of the chest, abdomen and pelvis

Magnetic resonance cholangiopancreatography (MRCP)	25%
Endoscopic resonance cholangiopancreatography (ERCP)	17%
US abdomen	7%
Abdominal X-ray	2%
CT scan of the chest, abdomen and pelvis	49%

High-resolution CT scanning is the diagnostic investigation of choice for pancreatic cancer

Important for me Less important

CT scan of the chest, abdomen and pelvis is the most appropriate investigation. The most likely cause of the patient's jaundice is recurrence of pancreatic cancer, and a CT is the most appropriate modality to assess tumour size and also to investigate for lymphatic and metastatic spread. None of the other investigations would reveal tumour growth, and an endoscopic approach would be difficult post-operatively. Abdominal X-ray and US would not be able to show tumour growth.

Source:

'Pancreatic Cancer.' BMJ Best Practice. 11 Dec. 2015.

Dr Assem

Which one of the following foodstuffs contains the most calories per unit weight?

☐ White bread

☐ Butter

☐ Pasta

☐ Sugar

☐ Red meat

White bread

5%

Butter

76%

Pasta

5%

Sugar

9%

Red meat

5%

Dr. Assem

A 56-year-old overweight female is found to have non-alcoholic fatty liver disease on abdominal ultrasound following recent pyelonephritis. She is completely asymptomatic and has normal liver function tests.

What is the recommend investigation to monitor for advanced liver fibrosis in this patient?

- ☐ Liver biopsy
- ☐ Yearly liver function tests
- ☐ Yearly albumin and coagulation screen
- ☐ Repeat ultrasound every 3 years
- ☐ Enhanced liver fibrosis test every 3 years

Liver biopsy	8%
Yearly liver function tests	12%
Yearly albumin and coagulation screen	7%
Repeat ultrasound every 3 years	17%
Enhanced liver fibrosis test every 3 years	56%

In patients with non-alcoholic fatty liver disease, enhanced liver fibrosis (ELF) testing is recommended to aid diagnosis of liver fibrosis

Important for me Less important

The correct answer is enhanced liver fibrosis or ELF test. Patients who are found at ultrasound to have asymptomatic non-alcoholic fatty liver disease (NAFLD) should undergo an ELF test to check for evidence of advanced liver fibrosis and this should be repeated every three years. People with confirmed NAFLD and an ELF score >10.51 are diagnosed with advanced liver fibrosis.

Liver biopsy would be the correct answer if the question asked about a diagnosis of cirrhosis, but only in patients for whom transient elastography is not an option.

Per NICE guidelines routine liver function tests are not indicated for diagnosis of advanced liver fibrosis in patients with NAFLD, making this answer incorrect.

Whilst albumin and coagulation screen may demonstrate evidence of impaired liver function these are not diagnostic of advanced liver fibrosis. As such option 3 is incorrect.

Repeat ultrasound would not be helpful in the diagnosis of advanced liver fibrosis. In patients with confirmed cirrhosis, however, it may be useful for monitoring for hepatocellular carcinoma but this would be twice yearly.

A 23-year-old nurse is reviewed in occupational health following a needle stick injury from a man known to be a carrier of hepatitis B. Which one of the following would appear first during acute hepatitis B infection?

☐ HBsAg

☐ HBeAg

☐ anti-HBc

☐ anti-HBs

☐ HBcAg

HBsAg

77%

HBeAg

7%

anti-HBc

3%

anti-HBs

7%

HBcAg

7%

A 78-year-old woman is admitted with a productive cough and pyrexia to hospital. Chest x-ray shows a pneumonia and she is commenced on intravenous ceftriaxone. Four days following admission a stool sample is sent because of diarrhoea. This confirms the suspected diagnosis of *Clostridium difficile* diarrhoea and a 10-day course of oral metronidazole is started. After 10 days her diarrhoea is ongoing but she remains clinically stable. What is the most appropriate treatment?

- ☐ Oral vancomycin for 14 days
- ☐ IV vancomycin for 3 days
- ☐ Oral rifampicin for 7 days
- ☐ Oral clindamycin for 7 days
- ☐ Oral metronidazole for a further 7 days

Oral vancomycin for 14 days

72%

IV vancomycin for 3 days

7%

Oral rifampicin for 7 days

3%

Oral clindamycin for 7 days

3%

Oral metronidazole for a further 7 days

14%

If *C. difficile* does not respond to first line metronidazole, oral vancomycin should be used next, except in life-threatening infections

Important for me Less important

The Health Protection Agency suggests switching to oral vancomycin in this scenario.

A 27-year-old woman presents for review. She describes herself as having 'IBS' and for the past two years has suffered intermittent bouts of abdominal pain, bloating and loose stools. For the past two weeks however her symptoms have been much worse. She is now passing around 3-4 watery, grey, 'frothy' stools per day. Her abdominal bloating and cramps have also worsened and she is suffering from excessive flatulence. Judging by the fitting of her clothes she also feels that she has lost weight. Some blood tests are ordered:

Hb	10.9 g/dl
Platelets	$199 \times 10^9/l$
WBC	$7.2 \times 10^9/l$
Ferritin	15 ng/ml
Vitamin B12	225 ng/l
Folate	2.1 nmol/l

What is the most likely diagnosis?

- ☐ Crohn's disease
- ☐ Coeliac disease
- ☐ Infective exacerbation of irritable bowel syndrome
- ☐ Ulcerative colitis
- ☐ Bacterial overgrowth syndrome

Crohn's disease	10%
Coeliac disease	50%
Infective exacerbation of irritable bowel syndrome	8%
Ulcerative colitis	5%
Bacterial overgrowth syndrome	27%

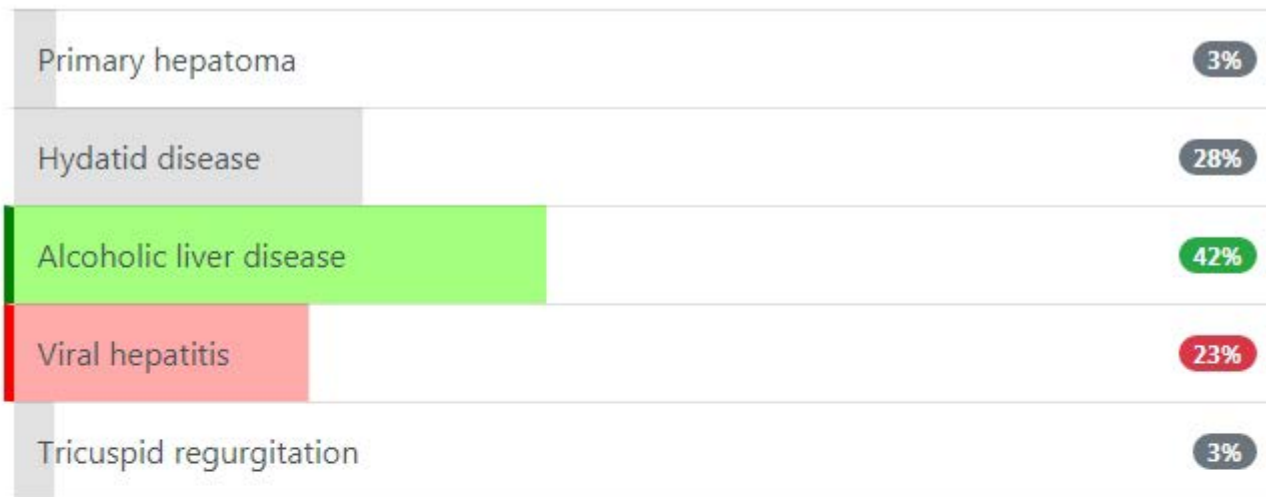
The main clues in this question are the anaemia and low ferritin/folate levels, all characteristic of coeliac disease. The description of the diarrhoea is also typical although some patients may have more overtly 'fatty' stools.

Why not irritable bowel syndrome? Common things are common and atypical presentations of common conditions are seen more than typical presentations of less common conditions. The main reason is the bloods - a low ferritin and folate would not develop with IBS +/- gastroenteritis. Even if the woman suffered from menorrhagia this would not explain the low folate although it may account for the anaemia/low ferritin.

Coeliac disease is more common than Crohn's by a factor of around 100. In exams there are also usually more clues to point towards a diagnosis of Crohn's (e.g. mouth ulcers etc).

A 45-year-old man is noted to have non-tender, smooth hepatomegaly associated Dupuytren's contracture and parotid enlargement. He recently returned from a holiday in Thailand. What is the likely diagnosis?

- ☐ Primary hepatoma
- ☐ Hydatid disease
- ☐ Alcoholic liver disease
- ☐ Viral hepatitis
- ☐ Tricuspid regurgitation



Early stage liver cirrhosis is a common cause of hepatomegaly. The liver may shrink in more advanced disease

Important for me Less important

Both Dupuytren's contracture and parotitis are associated with alcoholic liver disease. Whilst a history of alcohol excess would normally be volunteered it should be remembered many patients will lie about their alcohol intake.

The recent holiday in Thailand is a distractor.

A 54-year-old man is investigated for dyspepsia. An endoscopy shows a gastric ulcer and a CLO test done during the procedure demonstrates *H. pylori* infection. A course of *H. pylori* eradication therapy is given. Six weeks later the patients comes for review. What is the most appropriate test to confirm eradication?

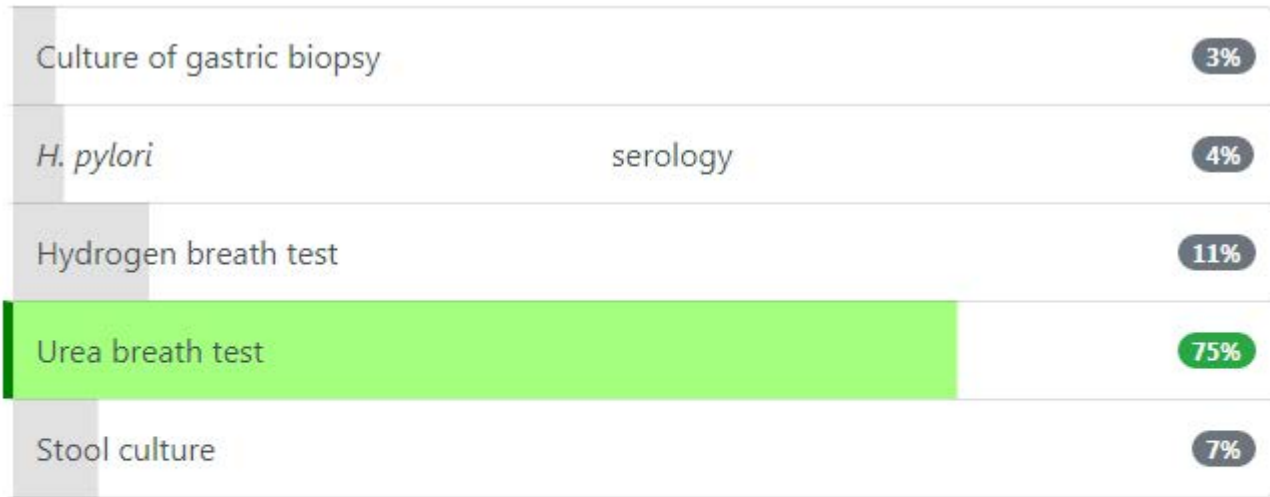
☐ Culture of gastric biopsy

☐ *H. pylori* serology

☐ Hydrogen breath test

☐ Urea breath test

☐ Stool culture



It is important to remember that *H. pylori* serology remains positive following eradication.

A stool antigen test, not culture, may be an appropriate alternative.

An 84-year-old male presents to the GP following a blood test that demonstrated a haemoglobin of 84 g/L. He also remarked he had been passing some black motions recently but had no weight loss. A previous colonoscopy had been performed which demonstrated no polyps or malignancy but multiple angiodysplastic lesions were documented. On examination, the GP identifies a murmur. What valvular dysfunction was likely to cause the audible murmur?

☐ Aortic regurgitation

☐ Mitral stenosis

☐ Aortic stenosis

☐ Mitral regurgitation

☐ Pulmonary stenosis

Aortic regurgitation

11%

Mitral stenosis

3%

Aortic stenosis

73%

Mitral regurgitation

8%

Pulmonary stenosis

4%

Angiodysplasia is associated with aortic stenosis

Important for me [Less important](#)

The combination of aortic stenosis and colonic angiodysplasia resulting in a GI bleed is indicative of Heyde's syndrome.

The condition develops due to a reduction in vWF as the blood passes through a narrow aortic valve. Treatment of the condition is that of treating the aortic stenosis.

The other valvular problems are not associated with this syndrome.

A 65-year-old man with liver cirrhosis of unknown cause is reviewed in clinic. Which one of the following factors is most likely to indicate a poor prognosis?

☐ Alanine transaminase > 200 u/l

☐ Caput medusae

☐ Ascites

☐ Raised urea

☐ Splenomegaly

Alanine transaminase > 200 u/l

5%

Caput medusae

13%

Ascites

54%

Raised urea

20%

Splenomegaly

8%

Ascites is part of the Child-Pugh and is a marker of poor prognosis. For patients with chronic liver disease it implies a mortality of 15% per year and around 45% within five years.

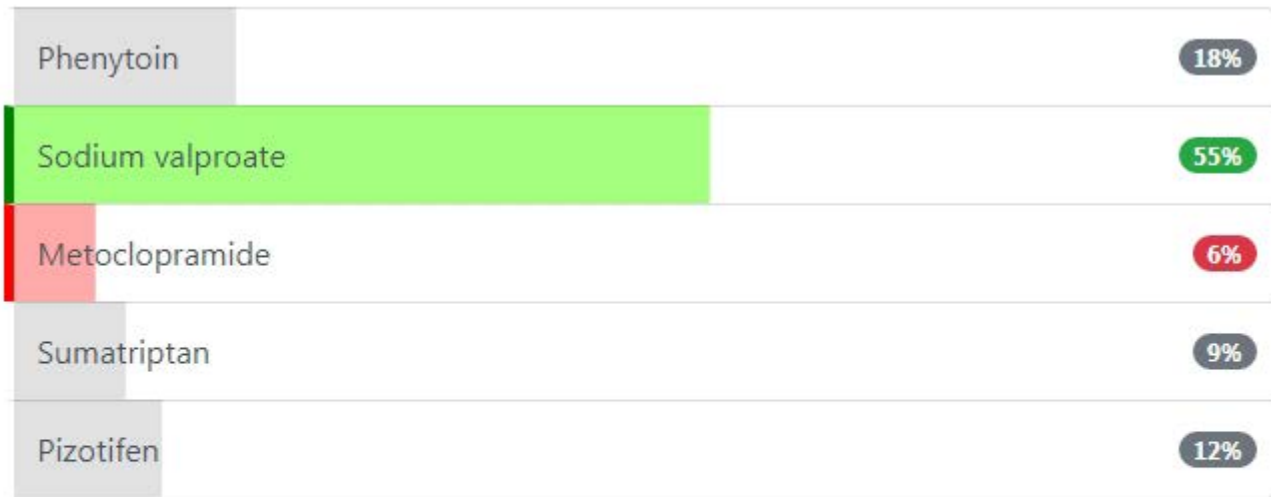
Serum creatinine, rather than urea, is part MELD criteria.

A 34-year-old male is admitted with central abdominal pain radiating through to the back and vomiting. The following results are obtained:

Amylase	1,245 u/dl
---------	------------

Which one of the following medications is most likely to be responsible?

- ☐ Phenytoin
- ☐ Sodium valproate
- ☐ Metoclopramide
- ☐ Sumatriptan
- ☐ Pizotifen



Sodium valproate induced pancreatitis is more common in young adults and tends to occur within the first few months of treatment. Asymptomatic elevation of the amylase level is seen in up to 10% of patients

A 25-year-old man presents with lethargy and increased skin pigmentation. Blood test reveal deranged liver function tests and impaired glucose tolerance. Given the likely diagnosis of haemochromatosis, what is the most appropriate initial investigation strategy?

☐ Transferrin saturation + ferritin

☐ Haematocrit + ferritin

☐ Liver biopsy with Perl's stain

☐ Serum iron + ferritin

☐ Serum iron + haematocrit

Transferrin saturation + ferritin	76%
Haematocrit + ferritin	4%
Liver biopsy with Perl's stain	5%
Serum iron + ferritin	10%
Serum iron + haematocrit	4%

Screening for haemochromatosis

- general population: transferrin saturation > ferritin
- family members: HFE genetic testing

Important for me Less important

The British Committee for Standards in Haematology (BCSH) guidelines recommend measuring the transferrin saturation first as this is the most specific and sensitive test for iron accumulation. They also recommend that serum ferritin is measured but this marker is not usually abnormal in the early stages of iron accumulation

A 59-year-old woman is admitted to the Emergency Department with a productive cough and pyrexia. She is usually fit and well but is undergoing investigation for dysphagia. This has been present for the past 3 months and affects both food and drink. A chest x-ray shows an air-fluid level behind a normal-sized heart. What is the most likely diagnosis?

☐ Massive pericardial effusion

☐ Tuberculosis

☐ Achalasia

☐ Pharyngeal pouch

☐ Hiatus hernia

A 59-year-old woman is admitted to the Emergency Department with a productive cough and pyrexia. She is usually fit and well but is undergoing investigation for dysphagia. This has been present for the past 3 months and affects both food and drink. A chest x-ray shows an air-fluid level behind a normal-sized heart. What is the most likely diagnosis?

Massive pericardial effusion

2%

Tuberculosis

2%

Achalasia

58%

Pharyngeal pouch

17%

Hiatus hernia

20%

A retrocardiac air-fluid level is sometimes seen in patients with achalasia

Which one of the following is least associated with hepatosplenomegaly?

- ☐ Glandular fever
- ☐ Chronic myeloid leukaemia
- ☐ Alcoholic liver disease
- ☐ Amyloidosis
- ☐ Infective endocarditis



Infective endocarditis normally causes an isolated splenomegaly. Theoretically severe infective endocarditis may cause right heart failure and hence hepatomegaly but this would be unusual

A 58-year-old male was admitted with a 8 month history of dysphagia, initially worse on solids, but now encompassing liquids. This is associated with weight loss, vomiting and for the last day odynophagia.

Barium swallow shows: Apple core stricture in the proximal third of the oesophagus.

Which of the following risk factors is only associated with increased risk of adenocarcinoma of the oesophagus?

- ☐ Alcohol
- ☐ Smoking
- ☐ Achalasia
- ☐ Plummer vinson
- ☐ Barrett's oesophagus



This 58-year-old male has presented with progressive dysphagia, initially worse on solids and then later to include liquids. This in a history should immediately prompt thoughts regarding malignancy. Barium swallow revealed a proximal apple core stricture, the proximal nature of which may be suggestive of squamous cell.

Risk factors for oesophageal cancer:

Squamous	Adenocarcinoma	
Alcohol	Alcohol	
Smoking	Smoking	
Achalasia		
Plummer vinson		
	Barrett's oesophagus	

A 35-year-old man who is usually fit and well presents with a 2 month history of indigestion. His weight is stable and there is no history of dysphagia. Examination of the abdomen is unremarkable. Of the following options, what is the most suitable initial management?

- ☐ Urea breath testing and non-urgent referral for endoscopy
- ☐ H pylori eradication therapy and full-dose proton pump inhibitor for three months
- ☐ Full-dose Proton pump inhibitor and immediate referral for endoscopy
- ☐ Three month course of a standard-dose proton pump inhibitor
- ☐ One month course of a full-dose proton pump inhibitor

Urea breath testing and non-urgent referral for endoscopy	29%
H pylori eradication therapy and full-dose proton pump inhibitor for three months	9%
Full-dose Proton pump inhibitor and immediate referral for endoscopy	3%
Three month course of a standard-dose proton pump inhibitor	11%
One month course of a full-dose proton pump inhibitor	48%

This question highlights the NICE guidelines for the management of dyspepsia.

There is no evidence currently to suggest whether a one month course of a PPI or 'test and treat' strategy should be adopted first line. Many clinicians prefer to test for H pylori first as this cannot be done within 2 weeks of acid-suppression therapy, as false-negative results may occur

Given the options available, only the answer is in line with current NICE guidelines

Which of the following skin conditions associated with malignancy are not correctly paired?

- ☐ Erythroderma and lymphoma
- ☐ Necrolytic migratory erythema and gastrinoma
- ☐ Acanthosis nigricans and gastrointestinal cancer
- ☐ Sweet's syndrome and myelodysplasia
- ☐ Erythema gyratum repens and lung cancer

Erythroderma and lymphoma

10%

Necrolytic migratory erythema and gastrinoma

49%

Acanthosis nigricans and gastrointestinal cancer

11%

Sweet's syndrome and myelodysplasia

12%

Erythema gyratum repens and lung cancer

18%

Necrolytic migratory erythema is associated with glucagonomas

A 54-year-old female is admitted one week following a cholecystectomy with profuse diarrhoea. What is the most likely diagnosis?

- ☐ *Campylobacter*
- ☐ *E. coli*
- ☐ *Clostridium difficile*
- ☐ *Salmonella*
- ☐ *Staphylococcus aureus*

Campylobacter

6%

E. coli

20%

Clostridium difficile

63%

Salmonella

4%

Staphylococcus aureus

6%

Clostridium difficile is the most likely cause as the patient would have been given broad-spectrum antibiotics at the time of the operation

Which of the following statements is true regarding the genetics of colon cancer?

- ☐ Hereditary non-polyposis colorectal carcinoma is an autosomal recessive condition
- ☐ The adenomatous polyposis coli gene is located on chromosome 12
- ☐ Around 50% of patients with familial adenomatous polyposis develop colon cancer
- ☐ Both hereditary and non-hereditary colon cancers typically present at 60-70 yrs of age
- ☐ Non-inherited colon cancer often involves mutation of the adenomatous polyposis coli gene

Hereditary non-polyposis colorectal carcinoma is a autosomal recessive condition

13%

The adenomatous polyposis coli gene is located on chromosome 12

15%

Around 50% of patients with familial adenomatous polyposis develop colon cancer

25%

Both hereditary and non-hereditary colon cancers typically present at 60-70 yrs of age

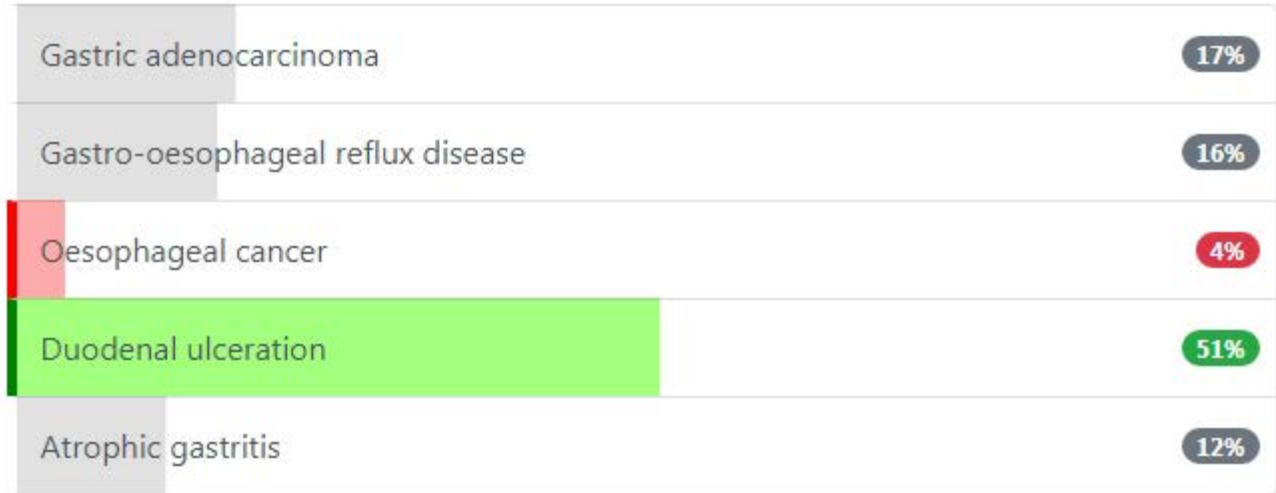
7%

Non-inherited colon cancer often involves mutation of the adenomatous polyposis coli gene

39%

A patient with upper gastrointestinal symptoms tests positive for *Helicobacter pylori* following a urea breath test. Which one of the following conditions is most strongly associated *Helicobacter pylori* infection?

- ☐ Gastric adenocarcinoma
- ☐ Gastro-oesophageal reflux disease
- ☐ Oesophageal cancer
- ☐ Duodenal ulceration
- ☐ Atrophic gastritis



Helicobacter pylori infection is also associated with both gastric adenocarcinoma and atrophic gastritis but the strongest association is with duodenal ulceration.

A 67-year-old man with chronic hepatitis B presents to the emergency department. He has been stable for the last 10 years, however, today he has noticed a yellowing of his skin and his wife mentions that he has been a little confused.

Which of the following may be a cause of this man's decompensation?

☐ High carbohydrate diet

☐ Low protein diet

☐ Diarrhoea

☐ Constipation

☐ High fibre diet

High carbohydrate diet

7%

Low protein diet

9%

Diarrhoea

11%

Constipation

67%

High fibre diet

6%

Constipation can be a trigger for liver decompensation in cirrhotic patients

Important for me Less important

This question is asking about a man with a cirrhotic liver following chronic hepatitis. In this case, he is showing signs of liver decompensation (jaundice and confusion). There are many causes of liver decompensation and you should make sure to find any underlying cause to ensure it is treated promptly.

From the list above constipation is a common cause of liver decompensation, this is due to the accumulation of toxic products within the body. In fact, some patients with liver decompensation and hepatic encephalopathy are treated with enemas to reduce the uptake of toxic products.

Other common causes include infection, electrolyte imbalances, dehydration, upper GI bleeds or increased alcohol intake.

Dr. P. Sem

Autoimmune hepatitis is most characteristically associated with elevated levels of which one of the following immunoglobulins?

☐ IgE

☐ IgA

☐ IgD

☐ IgM

☐ IgG

IgE

6%

IgA

12%

IgD

3%

IgM

24%

IgG

56%

A nurse undergoes primary immunisation against hepatitis B. Levels of which one of the following should be checked four months later to ensure an adequate response to immunisation?

- ☐ Anti-HBs
- ☐ Anti-HBc
- ☐ Hepatitis B viral load
- ☐ HbeAg
- ☐ HBsAg



A horizontal bar chart with five rows. The first row, 'Anti-HBs', has a green bar and a green pill with '77%'. The second row, 'Anti-HBc', has a grey bar and a grey pill with '8%'. The third row, 'Hepatitis B viral load', has a grey bar and a grey pill with '4%'. The fourth row, 'HbeAg', has a red bar and a red pill with '3%'. The fifth row, 'HBsAg', has a grey bar and a grey pill with '9%'. The bars are ordered from top to bottom: Anti-HBs, Anti-HBc, Hepatitis B viral load, HbeAg, HBsAg.

Marker	Percentage
Anti-HBs	77%
Anti-HBc	8%
Hepatitis B viral load	4%
HbeAg	3%
HBsAg	9%

Anti-HBs

77%

Anti-HBc

8%

Hepatitis B viral load

4%

HbeAg

3%

HBsAg

9%

It is preferable to achieve anti-HBs levels above 100 mIU/ml, although levels of 10 mIU/ml or more are generally accepted as enough to protect against infection

Dr. Aseem

Which one of the following statements is **incorrect** regarding Dubin-Johnson syndrome?

- ☐ Runs a benign course
- ☐ Due to a defect in the canalicular multispecific organic anion transporter
- ☐ Causes defective hepatic bilirubin excretion
- ☐ It is an autosomal recessive disorder
- ☐ Results in an unconjugated hyperbilirubinaemia

Runs a benign course

9%

Due to a defect in the canalicular multispecific organic anion transporter

12%

Causes defective hepatic bilirubin excretion

13%

It is an autosomal recessive disorder

12%

Results in an unconjugated hyperbilirubinaemia

55%

Each one of the following is associated with pancreatic cancer, except:

☐ Chronic pancreatitis

☐ Smoking

☐ Blood group O

☐ Diabetes

☐ BRCA2 gene

Chronic pancreatitis

3%

Smoking

3%

Blood group O

59%

Diabetes

10%

BRCA2 gene

25%

Dr. Ssem

A 42-year-old woman is investigated for lethargy and diarrhoea. Investigations reveal positive anti-endomysial antibodies. Each of the following food stuffs should be avoided, except:

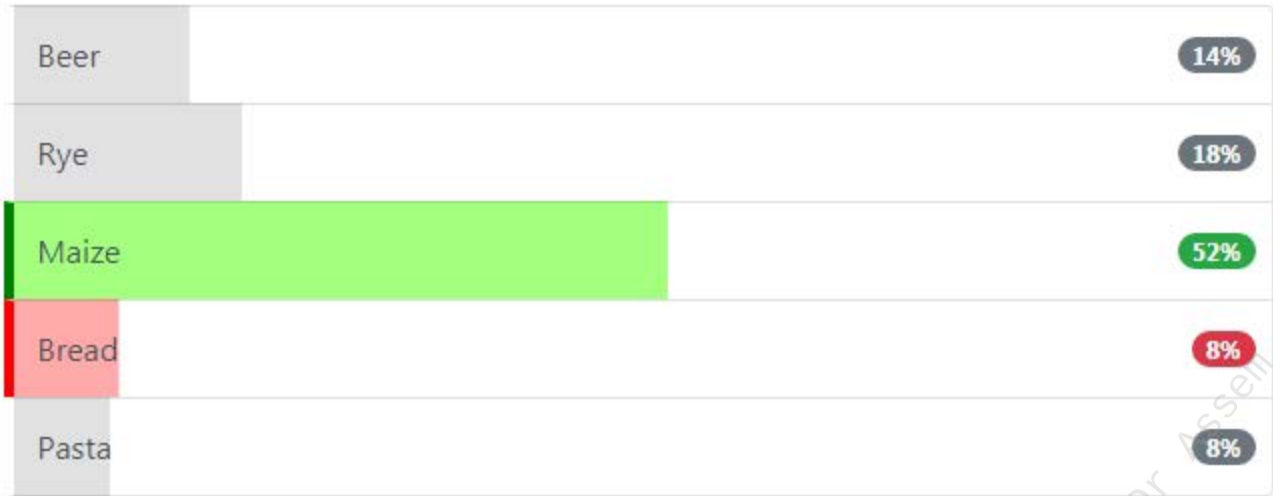
☐ Beer

☐ Rye

☐ Maize

☐ Bread

☐ Pasta



Which one of the following factors is most responsible for the increased rate of colorectal cancer in patients with ulcerative colitis?

- ☐ Shared mutation in the HNPCC gene
- ☐ Chronic inflammation
- ☐ Increased surveillance with colonoscopy
- ☐ Increased susceptibility to bacterial gastroenteritis
- ☐ Prolonged immunosuppression

Shared mutation in the HNPCC gene

22%

Chronic inflammation

57%

Increased surveillance with colonoscopy

7%

Increased susceptibility to bacterial gastroenteritis

4%

Prolonged immunosuppression

9%

Chronic inflammation is an important factor in the development of a number of cancers. An example is hepatocellular carcinoma secondary to viral hepatitis.

Primary sclerosing cholangitis is most associated with:

- ☐ Primary biliary cirrhosis
- ☐ Crohn's disease
- ☐ Hepatitis C infection
- ☐ Ulcerative colitis
- ☐ Coeliac disease

Primary biliary cirrhosis

6%

Crohn's disease

8%

Hepatitis C infection

7%

Ulcerative colitis

74%

Coeliac disease

6%

A 45-year-old man known to have haemochromatosis attends for blood test to assess when he next needs venesection. Of the options given, which one of the following blood tests should be used to assess the adequacy of venesection?

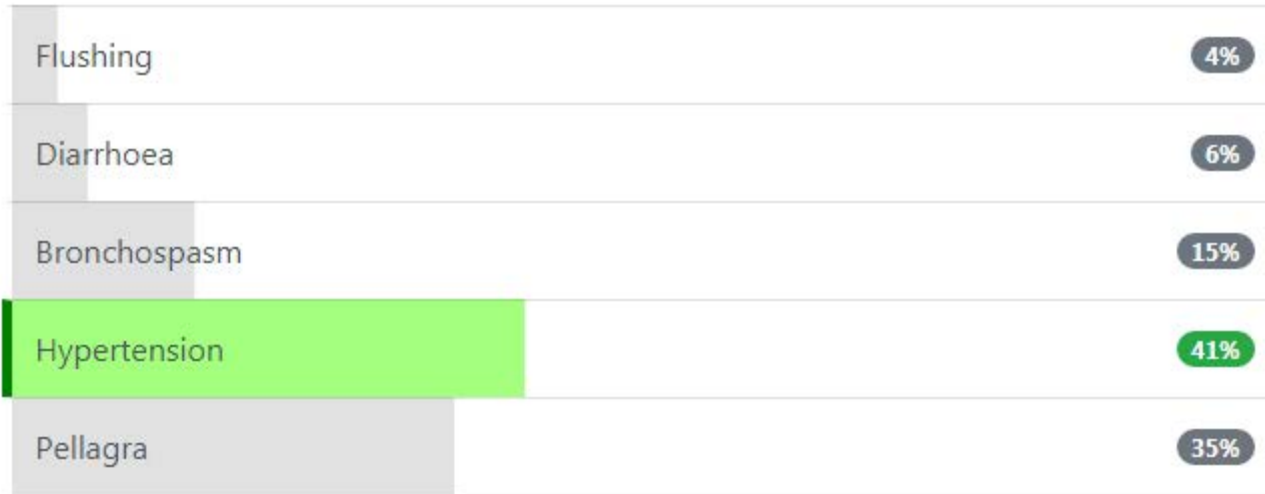
- ☐ Ferritin
- ☐ Serum iron
- ☐ Haemoglobin
- ☐ Total iron binding capacity
- ☐ Haematocrit

Ferritin	53%
Serum iron	6%
Haemoglobin	6%
Total iron binding capacity	17%
Haematocrit	18%

The British Committee for Standards in Haematology recommend 'transferrin saturation should be kept below 50% and the serum ferritin concentration below 50 ug/l'

Which one of the following features is not seen in carcinoid syndrome?

- ☐ Flushing
- ☐ Diarrhoea
- ☐ Bronchospasm
- ☐ Hypertension
- ☐ Pellagra



Flushing, diarrhoea, bronchospasm, tricuspid stenosis, pellagra → carcinoid with liver mets - diagnosis: urinary 5-HIAA

Important for me Less important

Hypo- not hypertension is seen in carcinoid syndrome secondary to serotonin release

A 39-year-old man is admitted to hospital with decompensated liver disease of unknown aetiology. As part of a liver screen the following results are obtained:

Anti-HBs	Positive
Anti-HBc	Negative
HBs antigen	Negative

Anti-HBs = Hepatitis B Surface Antibody; Anti-HBc = Hepatitis B Core Antibody; HBs antigen = Hepatitis B Surface Antigen

What is this man's hepatitis B status?

- ☐ Chronic hepatitis B - highly infectious
- ☐ Previous immunisation to hepatitis B
- ☐ Probable hepatitis D infection
- ☐ Acute hepatitis B infection
- ☐ Chronic hepatitis B - not infectious

Chronic hepatitis B - highly infectious

3%

Previous immunisation to hepatitis B

80%

Probable hepatitis D infection

2%

Acute hepatitis B infection

7%

Chronic hepatitis B - not infectious

9%

A 17-year-old female presents with a two-day history of right iliac fossa pain, nausea and loss of appetite. You suspect that she has acute appendicitis. Which scoring system, if sufficiently raised, could you use to lend support to your diagnosis?

☐ Child-Pugh score

☐ Glasgow score

☐ Alvarado score

☐ MELD score

☐ Centor score

Child-Pugh score

4%

Glasgow score

7%

Alvarado score

69%

MELD score

11%

Centor score

9%

The Alvarado score can be used to suggest the likelihood that a patient has acute appendicitis

Important for me Less important

The correct answer is the Alvarado score. It consists of eight different criteria (symptoms, signs and laboratory results) and divides patients into appendicitis unlikely, possible, probable and definite.

The Child-Pugh score assesses prognosis in liver cirrhosis. The Glasgow score assesses severity of acute pancreatitis. The MELD score assesses the severity of end-stage liver disease. The Centor assesses the likelihood that a pharyngitis is due to Streptococcus.

MD-CALC Alvarado score

<https://www.mdcalc.com/alvarado-score-acute-appendicitis>

Dr Assem

A 62-year-old man with a history of alcohol abuse undergoes an esophago-gastroduodenoscopy (OGD) following several episodes of unexplained epigastric pain. Several varices are identified in the lower oesophagus. It is decided that he is put on a prophylactic medication to reduce the risk of variceal bleeding.

Which of the following medications would be most appropriate?

- ☐ Omeprazole
- ☐ Warfarin
- ☐ Unfractionated heparin
- ☐ Propranolol
- ☐ Vasopressin

Omeprazole	7%
Warfarin	2%
Unfractionated heparin	3%
Propranolol	79%
Vasopressin	9%

A non-cardioselective B-blocker (NSBB) is used for the prophylaxis of oesophageal bleeding

Important for me Less important

This question requires you to understand the measures taken to reduce the risk of major bleeding in patients with oesophageal varices.

Omeprazole - This is not the most appropriate answer. Omeprazole is used in the prevention and treatment of peptic ulcers.

Warfarin - This is not the most appropriate answer. Warfarin would increase the risk of bleeding.

Unfractionated heparin - This is not the most appropriate answer. Unfractionated heparin would increase the risk of bleeding.

Propranolol - This is the correct answer. A non-cardioselective β blocker (NSBB) is used for primary and secondary prevention of bleeding in oesophageal varices. They act by causing splanchnic vasoconstriction, reducing portal blood flow.

Vasopressin- This is not the most appropriate answer. The synthetic analogue of this medication, terlipressin, may be used to reduce acute variceal bleeding but not as a prophylactic agent.

A 21-year-old lady is admitted to hospital from her GP with her mother due to extremely low body mass index (BMI). Her GP notes explain that she has a history of anorexia nervosa. Her mother explains that she hasn't been eating well for the last couple of months and on examination the patient has a BMI of 14.0kg/m^2 and looks unwell. You are aware that some patients, such as those with eating disorders, are at risk of refeeding syndrome.

Given this patient's history, which of the following electrolyte imbalances would suggest that she is at risk of refeeding syndrome?

- ☐ Hypermagnesaemia
- ☐ Hypophosphataemia
- ☐ Hyperkalaemia
- ☐ Hyperphosphataemia
- ☐ Thiamine overload

Hypermagnesaemia	5%
Hypophosphataemia	80%
Hyperkalaemia	5%
Hyperphosphataemia	7%
Thiamine overload	2%

Hypophosphataemia is a characteristic biochemical sign in patients at risk of refeeding syndrome

Important for me Less important

Option 2 - hypophosphataemia is the correct option. This is a commonly recognised biochemical sign of refeeding syndrome.

In anorexia nervosa, the patient has inadequate dietary intake and may make use of other methods to lose weight. With poor intake and increased clearance, these patients can quickly become electrolyte deficient, therefore:

Option 1 is incorrect as refeeding syndrome is associated with **hypomagnesaemia**.

Option 3 is incorrect as refeeding syndrome is associated with **hypokalaemia**.

Option 4 is incorrect as refeeding syndrome is associated with **hypophosphataemia**.

Option 5 is incorrect as refeeding syndrome is associated with thiamine **deficiency**

A 23-year-old woman is referred to the neurology clinic after developing a unilateral hand tremor. Over the past 12 months her family report changes in her behaviour and mood associated with some speech problems. On examination a tremor is noted in the right-hand at rest. There also appears to be paucity of movement and some bradykinesia. Dark circular marks are also noted around the iris. The patient reports that her uncle died of liver cirrhosis at the age of 40 years. Given the likely diagnosis, what is the mode of inheritance?

- ☐ Autosomal dominant
- ☐ Mitochondrial
- ☐ X-linked recessive
- ☐ Autosomal recessive
- ☐ Polygenic

Autosomal dominant

19%

Mitochondrial

5%

X-linked recessive

6%

Autosomal recessive

65%

Polygenic

4%

Wilson's disease - autosomal recessive

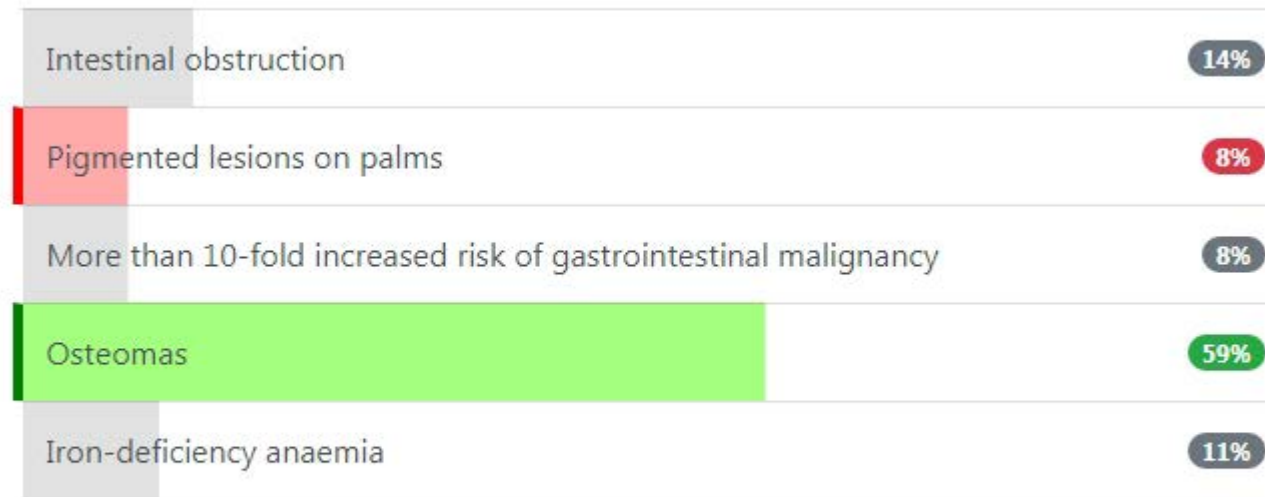
Important for me Less important

This patient has Wilson's disease as evidence by the neuropsychiatric symptoms, Kayser-Fleischer rings and family history of liver disease.

Which one of the following is not a feature of Peutz-Jeghers syndrome?

- ☐ Intestinal obstruction
- ☐ Pigmented lesions on palms
- ☐ More than 10-fold increased risk of gastrointestinal malignancy
- ☐ Osteomas
- ☐ Iron-deficiency anaemia

Which one of the following is not a feature of Peutz-Jeghers syndrome?



Osteomas are a feature of Gardner's syndrome, a variant of familial adenomatous polyposis

What percentage of cases of chronic pancreatitis in the UK are due to alcohol excess?

☐ 35%

☐ 50%

☐ 65%

☐ 80%

☐ 95%

35%

15%

50%

15%

65%

23%

80%

40%

95%

7%

The most common cause of chronic pancreatitis is alcohol excess

Important for me Less important

A 27-year-old female presents with alternating loose and hard stools associated with abdominal discomfort and bloating. Which one of the following is it most important to do before making a positive diagnosis of irritable bowel syndrome?

- ☐ Arrange ultrasound abdomen
- ☐ Flexible sigmoidoscopy
- ☐ Ask about family history of ovarian cancer
- ☐ Use a standardised screening tool for depression
- ☐ Perform thyroid function tests

Arrange ultrasound abdomen

10%

Flexible sigmoidoscopy

23%

Ask about family history of ovarian cancer

35%

Use a standardised screening tool for depression

10%

Perform thyroid function tests

22%

A 24-year-old man presents with rectal bleeding and pain on defecation. This has been present for the past two weeks. He has a tendency towards constipation and notices that when he wipes himself fresh blood is often on the paper. Rectal examination is limited due to pain but no external abnormalities are seen. What is the most likely diagnosis?

☐ Internal haemorrhoids

☐ Anal carcinoma

☐ Rectal polyp

☐ Anogenital herpes

☐ Anal fissure

Internal haemorrhoids

18%

Anal carcinoma

2%

Rectal polyp

3%

Anogenital herpes

2%

Anal fissure

75%

Superficial anal fissures may be difficult to see on examination.

Dr. Assem

Which one of the following is least useful in assessing the severity of a patient with liver cirrhosis?

- ☐ ALT
- ☐ Prothrombin time
- ☐ Bilirubin
- ☐ The presence of ascites
- ☐ The presence of encephalopathy

ALT

67%

Prothrombin time

8%

Bilirubin

16%

The presence of ascites

5%

The presence of encephalopathy

4%

A 27-year-old female is referred to the medical outpatient clinic due to a long history of fatigue and joint pains. An autoimmune screen is done which is positive for smooth muscle antibodies. What is the most appropriate next investigation?

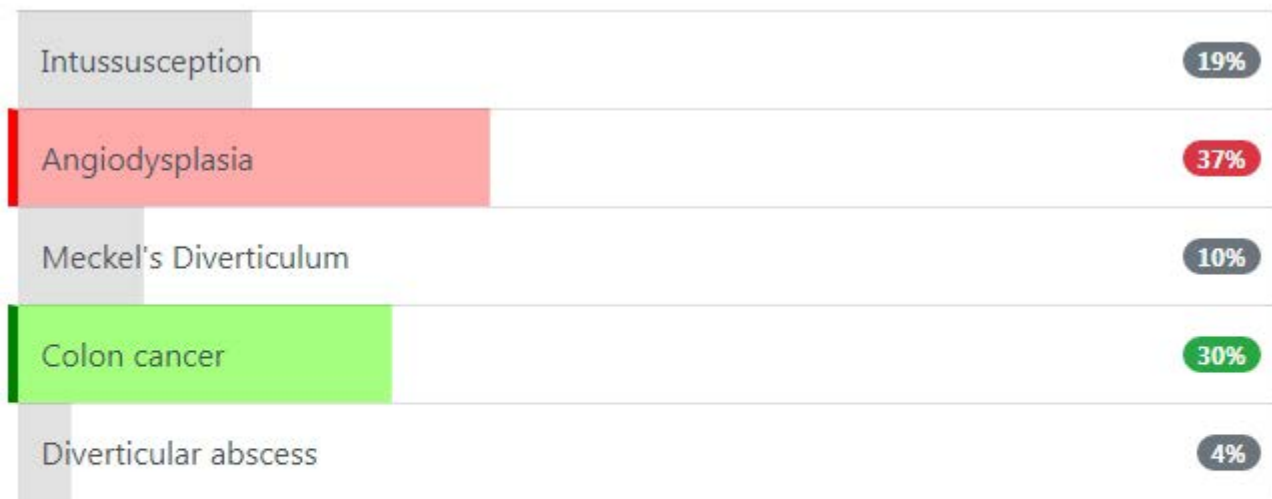
- ☐ Liver function tests
- ☐ Thyroid function tests
- ☐ Creatine kinase
- ☐ Serum glucose
- ☐ Electrocardiogram



Smooth muscle antibodies are associated with autoimmune hepatitis. Presentation is usually insidious and extrahepatic clinical features are common

A 43-year-old man presents with diarrhoea and rectal bleeding for the past ten days. On examination he has brown pigmented lesions on his lips and palms but abdominal and rectal examination is unremarkable. What is the most likely cause for this presentation?

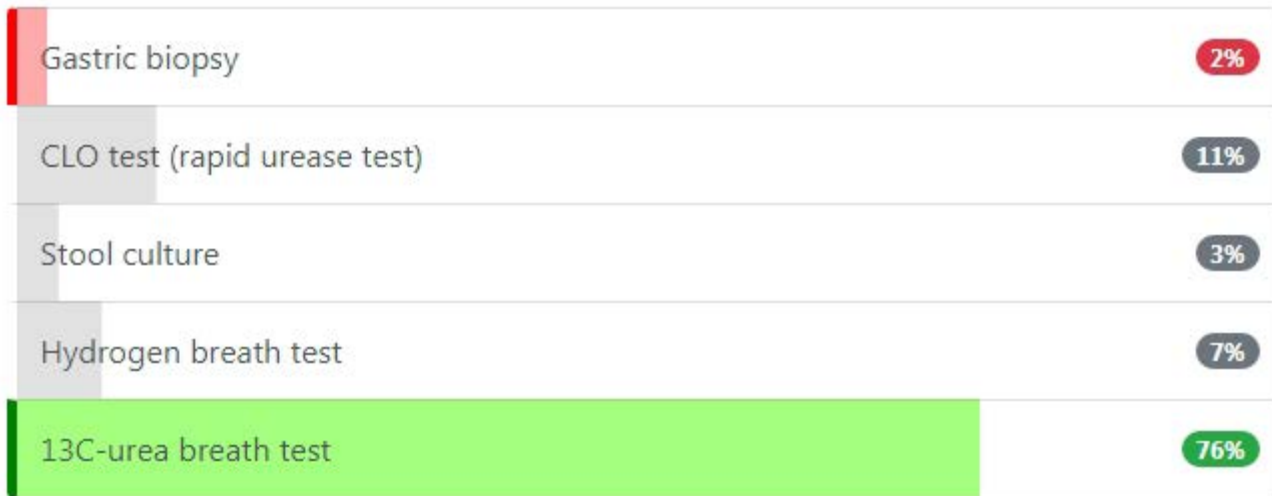
- ☐ Intussusception
- ☐ Angiodysplasia
- ☐ Meckel's Diverticulum
- ☐ Colon cancer
- ☐ Diverticular abscess



This patient has Peutz-Jeghers syndrome. Intussusception would not normally cause rectal bleeding at this age. Colon cancer is the most common type of gastrointestinal cancer that patients with Peutz-Jeghers syndrome develop.

A 36-year-old man presents with dyspepsia. No alarm symptoms are present. This is his first episode and he has no significant medical history of note. A test-and-treat strategy is agreed upon. What is the most appropriate investigation to test for *Helicobacter pylori*?

- ☐ Gastric biopsy
- ☐ CLO test (rapid urease test)
- ☐ Stool culture
- ☐ Hydrogen breath test
- ☐ ^{13}C -urea breath test



The urea breath test is highly sensitive, specific and non-invasive. There is no indication for an endoscopy. Stool antigen, rather than culture, is an alternative.

You are called urgently after hours to review a 69-year-old man on the cardiology ward who is hypotensive, tachycardic and having profuse melaena. He was commenced on dabigatran 150mg bd by the cardiologists 48 hours earlier for non-valvular atrial fibrillation. Following appropriate resuscitation which of the following treatments is most likely to improve his bleeding?

- ☐ Prothrombin complex
- ☐ Tranexamic acid
- ☐ Haemodialysis
- ☐ 72 hour omeprazole infusion
- ☐ Idarucizumab (Praxbind)

Prothrombin complex	25%
Tranexamic acid	17%
Haemodialysis	3%
72 hour omeprazole infusion	13%
Idarucizumab (Praxbind)	42%

Idarucizumab is a recently developed monoclonal antibody fragment which binds dabigatran with an affinity that is 350 times as high as with thrombin. Consequently, idarucizumab binds free and thrombin-bound dabigatran and rapidly neutralises its activity. Prior to its development management of bleeding on dabigatran was limited to dialysis or supportive treatment with blood products, which was only partially effective. PPI infusions have only ever been shown to be effective in acute upper GI bleeding post endoscopy in patients with stigmata of recent haemorrhage. Currently, dabigatran is the only direct acting oral anticoagulant to have a commercially available antidote, although others are in development.

It should be noted that despite rapid reversal, idarucizumab is not a 'magic bullet' for patients with dabigatran induced bleeding and resuscitation remains the cornerstone of management. Rapid reversal of warfarin with prothrombin complex or fresh frozen plasma has been available for many years; however, this has never been linked to improved outcomes. It should also be remembered that idarucizumab is very expensive and is therefore likely to be restricted to those patients with immediate and life threatening bleeds.

A 46-year-old woman with 10 year history of Crohn's disease presents for review in the gastroenterology clinic. She complains of persistent diarrhoea despite being on maintenance therapy and having normal inflammatory markers. A diagnosis of bile acid malabsorption is being considered. What is the most appropriate test to investigate this?

- ☐ Capsule endoscopy
- ☐ SeHCAT test
- ☐ ^{14}C -glycocholic breath test
- ☐ Ileal biopsy
- ☐ D-xylose test

Capsule endoscopy

6%

SeHCAT test

56%

^{14}C -glycocholic breath test

12%

Ileal biopsy

7%

D-xylose test

19%

SeHCAT is the investigation of choice for bile acid malabsorption

Important for me Less important

A 27-year-old woman with chronic left iliac fossa pain and alternating bowel habit is diagnosed with irritable bowel syndrome. Initial treatment is tried with a combination of antispasmodics, laxatives and anti-motility agents. Unfortunately after 6 months there has been no significant improvement in her symptoms. According to recent NICE guidelines, what is the most appropriate next step?

- ☐ Low-dose tricyclic antidepressant
- ☐ Cognitive behavioural therapy
- ☐ Refer for sigmoidoscopy
- ☐ Trial of probiotics
- ☐ Selective serotonin reuptake inhibitor

Low-dose tricyclic antidepressant

49%

Cognitive behavioural therapy

23%

Refer for sigmoidoscopy

9%

Trial of probiotics

7%

Selective serotonin reuptake inhibitor

13%

NICE recommend considering psychological interventions after 12 months. Tricyclic antidepressants should be used in preference to selective serotonin reuptake inhibitors

What are the most common type of antibodies seen in pernicious anaemia?

- ☐ Vitamin B12 receptor antibodies
- ☐ Gastric parietal cell antibodies
- ☐ Jejunal mucosa antibodies
- ☐ Intrinsic factor antibodies
- ☐ Vitamin B12 antibodies

Vitamin B12 receptor antibodies

9%

Gastric parietal cell antibodies

37%

Jejunal mucosa antibodies

6%

Intrinsic factor antibodies

41%

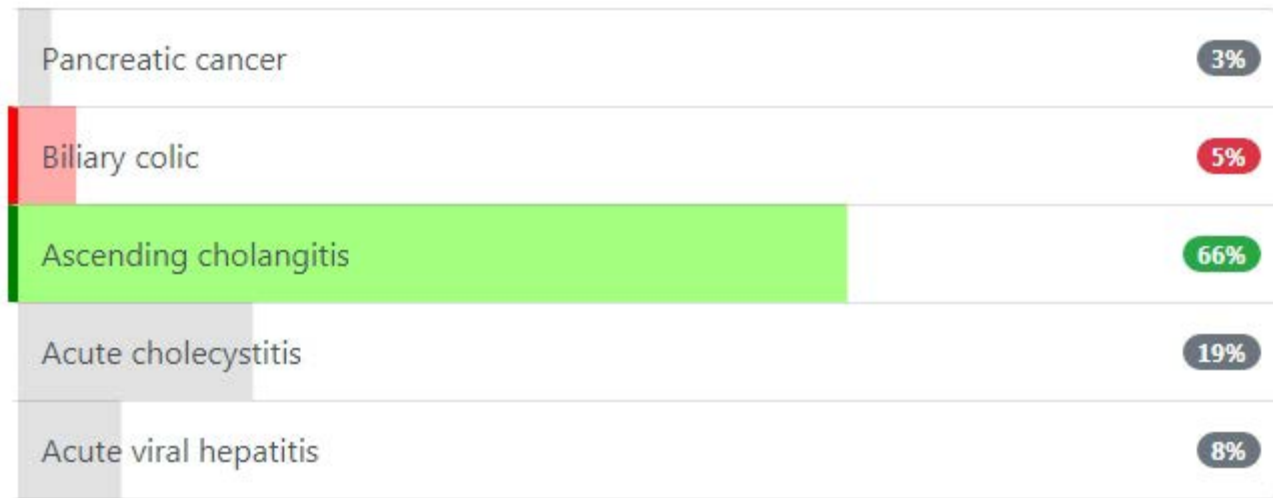
Vitamin B12 antibodies

6%

Dr Assem

A 55-year-old man with a history of gallstone disease presents with a two-day history of pain in the right upper quadrant. He feels 'like I have flu' and his wife reports he has had a fever for the past day. On examination his temperature is 38.1°C, blood pressure 100/60 mmHg, pulse 102/min and he is tender in the right upper quadrant. His sclera have a yellow-tinge. What is the most likely diagnosis?

- ☐ Pancreatic cancer
- ☐ Biliary colic
- ☐ Ascending cholangitis
- ☐ Acute cholecystitis
- ☐ Acute viral hepatitis



This patient has Charcot's triad (right upper quadrant pain, fever and jaundice), which is classically linked to ascending cholangitis. The systemic upset and jaundice are less typical of acute cholecystitis.

A 44-year-old obese female is noted to have gallstones during an abdominal ultrasound, which was requested due to repeated urinary tract infections. Apart from the repeated UTIs she is otherwise well. What is the most appropriate management of the gallstones?

- ☐ Ursodeoxycholic acid
- ☐ Extracorporeal Short Wave Lithotripsy
- ☐ List for laparoscopic cholecystectomy when 50 years old
- ☐ Observation
- ☐ List now for laparoscopic cholecystectomy

Ursodeoxycholic acid

9%

Extracorporeal Short Wave Lithotripsy

4%

List for laparoscopic cholecystectomy when 50 years old

3%

Observation

70%

List now for laparoscopic cholecystectomy

15%

You are the F2 doctor starting a twilight shift on the acute medical unit. A 50-year-old man with known alcoholic cirrhosis presented that morning to ambulatory care for an elective ascitic drain. On clerking he described feeling generally unwell over the last 2 days with fevers and non-specific abdominal pain. There was no history of cough, shortness of breath or dysuria and no other localising infective symptoms. His temperature was 38.1°C, heart rate 130bpm but observations were otherwise normal. He was visibly jaundiced on end-of-the-bed inspection. On examination the abdomen was generally tender, distended with shifting dullness and scars from previous ascitic drains in the right iliac fossa. Bowels sounds were present and normal.

ECG showed sinus tachycardia.

Bloods:

Hb 115 g/l	Na ⁺ 129 mmol/l	Bilirubin 40 µmol/l
Platelets 230 * 10 ⁹ /l	K ⁺ 4.8 mmol/l	ALP 280 u/l
WBC 17.0 * 10 ⁹ /l	Urea 8.0 mmol/l	ALT 65 u/l
Neuts 14.5 * 10 ⁹ /l	Creatinine 156 µmol/l	γGT 560 u/l
Lymphs 2.0 * 10 ⁹ /l		Albumin 29 g/l
CRP 130 mg/l		

Chest X-ray shows no acute abnormality.

The patient was admitted and has been started on IV normal saline and broad-spectrum antibiotics. Blood cultures have been sent. During the evening handover, the consultant requests that as the evening on-call you investigate for spontaneous bacterial peritonitis (SBP) and start IV cefotaxime if SBP is confirmed.

Which of the following would confirm a diagnosis of spontaneous bacterial peritonitis (SBP)?

- ☐ Blood cultures showing mixed growth.
- ☐ Paracentesis. Glucose >2.8 mmol/L in ascitic fluid
- ☐ Paracentesis. Neutrophil count >250 cells/µL in ascitic fluid
- ☐ Paracentesis. Organisms seen on Gram-stain of ascitic fluid
- ☐ Paracentesis. Neutrophil count >100 cells/µL in ascitic fluid

Blood cultures showing mixed growth.	2%
Paracentesis. Glucose >2.8 mmol/L in ascitic fluid	3%
Paracentesis. Neutrophil count >250 cells/ μ L in ascitic fluid	80%
Paracentesis. Organisms seen on Gram-stain of ascitic fluid	7%
Paracentesis. Neutrophil count >100 cells/ μ L in ascitic fluid	7%

In suspected SBP- diagnosis is by paracentesis. Confirmed by neutrophil count >250 cells/ μ L

Important for me Less important

Diagnosis of spontaneous bacterial peritonitis (SBP) is by paracentesis with a neutrophil count >250 cells/ μ L in the ascitic fluid.

1. Incorrect. Blood cultures are positive for the offending organism in SBP in up to 1/3 of patients and can help guide antibiotic regime. However, by the same token, blood cultures will be negative in more than 2/3 of cases of SBP. All patients with suspected SBP should have blood cultures done but they do not form part of the diagnostic criteria.

2. Incorrect. Glucose levels in the ascitic fluid do not form part of diagnostic criteria for SBP. Neutrophils in the ascitic fluid actually consume glucose and so the concentration is often low (<2.8 mmol/L)

3. Correct. SBP is confirmed by a paracentesis showing a neutrophil count >250 cells/ μ L. Based on this result a diagnosis can be made and the antibiotic of choice would be IV cefotaxime (as advised by your consultant).

4. Incorrect. Though Gram-stain of the ascitic fluid will often show organisms in SBP it is not reliable as a diagnostic test.

5. Incorrect. The neutrophil count is the key measure but the threshold for diagnosis of SBP is >250 cells/ μ L not 100.

A 31-year-old woman is admitted to hospital. As part of a liver screen the following results are obtained:

Anti-HBs	Positive
Anti-HBc	Positive
HBs antigen	Negative

Anti-HBs = Hepatitis B Surface Antibody; Anti-HBc = Hepatitis B Core Antibody; HBs antigen = Hepatitis B Surface Antigen

What is the patient's hepatitis B status?

- ☐ Previous immunisation to hepatitis B
- ☐ Chronic hepatitis B - highly infectious
- ☐ Previous hepatitis B infection, not a carrier
- ☐ Chronic hepatitis B - not infectious
- ☐ Acute hepatitis B infection

Previous immunisation to hepatitis B

16%

Chronic hepatitis B - highly infectious

8%

Previous hepatitis B infection, not a carrier

49%

Chronic hepatitis B - not infectious

22%

Acute hepatitis B infection

6%

A 65-year-old woman is referred in from her GP with deranged blood tests. She initially went to see the GP due to pain in her tongue and pain on swallowing. On examination, she has angular stomatitis, a red smooth tongue and splenomegaly.

Blood tests show:

Hb	102 g/L
WCC	10.9 $10^9/L$
plts	223 $10^9/L$
MCV	72 fL

What is the most likely diagnosis?

- ☐ Kawasaki disease
- ☐ Plummer-Vinson syndrome
- ☐ Vitamin B12 deficiency
- ☐ Behcets syndrome
- ☐ Oesophageal malignancy

Dr Assem

Kawasaki disease

7%

Plummer-Vinson syndrome

65%

Vitamin B12 deficiency

16%

Behcets syndrome

6%

Oesophageal malignancy

6%

You are reviewing a 45-year-old woman who has a history of coeliac disease in the gastroenterology clinic. Your consultant asks you to check that she is up-to-date with her immunisations. She is otherwise fit and well and her coeliac disease is well controlled.

Why do patients with coeliac disease require regular immunisations?

- Reduced absorption of proteins leads to hypogammaglobulinaemia
- Functional hyposplenism
- Reduced absorption of iron, vitamin B12 and folate impairs normal immunological function
- Higher incidence of T-cell dysfunction in patients with coeliac disease
- Up to 15% of patients with coeliac disease have mild primary immunodeficiencies

Reduced absorption of proteins leads to hypogammaglobulinaemia

10%

Functional hyposplenism

56%

Reduced absorption of iron, vitamin B12 and folate impairs normal immunological function

10%

Higher incidence of T-cell dysfunction in patients with coeliac disease

11%

Up to 15% of patients with coeliac disease have mild primary immunodeficiencies

13%

A 29-year-old female is noted to have an elevated bilirubin during a viral illness. Gilbert's syndrome is suspected. Which one of the following tests may confirm the diagnosis?

- ☐ Bromsulphthalein excretion test
- ☐ Ammonium chloride acidification test
- ☐ Urine analysis
- ☐ Nicotinic acid test
- ☐ Faecal fat excretion

Bromsulphthalein excretion test

17%

Ammonium chloride acidification test

17%

Urine analysis

21%

Nicotinic acid test

35%

Faecal fat excretion

11%

A known alcoholic presents to the emergency department with severe epigastric pain radiating to the back and a serum amylase of 1653U/L. According to either the Glasgow or Ranson scoring systems, which of the following indicate severe pancreatitis?

- ☐ Hypercalcaemia
- ☐ Serum amylase five times the upper limit of normal
- ☐ Raised serum lipase
- ☐ Hypocalcaemia
- ☐ Raised C-reactive protein

Hypercalcaemia

16%

Serum amylase five times the upper limit of normal

10%

Raised serum lipase

7%

Hypocalcaemia

36%

Raised C-reactive protein

30%

Hypocalcaemia in pancreatitis is a marker of disease severity

Important for me Less important

Hypocalcaemia occurs in pancreatitis due to the saponification of fats. As lipase leaks out of the damaged pancreas, it breakdown fat into triglycerides and fatty acids. Fatty acids combine with calcium to produce soap. Therefore, reduced serum calcium can be used as a surrogate marker for the level of enzymatic damage in pancreatitis.

Raised serum lipase and amylase are useful in diagnosis but do not feature in the Glasgow or Ranson scores.

Raised white cell count rather than C-reactive peptide feature in the Glasgow/Ranson criteria.

Dr Assem

You are asked to see an 18-year-old woman on the ward who has just commenced re-feeding for anorexia nervosa under a court order. Her baseline body mass index is 17 kg/m^2 . She has developed acute shortness of breath and muscle weakness a few hours after beginning the feed. On examination her blood pressure is 100/70 mmHg, her pulse is 88 beats per minute and regular. She has bilateral basal crackles on auscultation of the chest and 4/5 power weakness affecting her arms and legs. Which of the following is the most likely cause?

- ☐ Hyperkalaemia
- ☐ Hypochloraemia
- ☐ Hypocalcaemia
- ☐ Hypomagnesaemia
- ☐ Hypophosphataemia

Hyperkalaemia	5%
Hypochloraemia	4%
Hypocalcaemia	12%
Hypomagnesaemia	26%
Hypophosphataemia	53%

Although refeeding syndrome is most likely to be seen in patients with a body mass index of less than 16 kg/m^2 , it is still the most likely diagnosis here. High carbohydrate feeds can lead to a precipitous fall in phosphate levels because of reactive hyperinsulinaemia, and this, in turn, leads to heart failure and significant skeletal muscle weakness.

Low levels of potassium and magnesium may also be seen in re-feeding syndrome, but these do not have the same association with marked muscle weakness.

A 49-year-old woman who is known to have alcoholic liver disease is admitted to the ward following a decompensation. A diagnosis of grade II hepatic encephalopathy is made. She is confused and a screen looking for infection and other precipitants is performed. She is started on lactulose. What other medication may be used to prevent the hepatic encephalopathy if lactulose is ineffective?

☐ Neomycin

☐ Senna

☐ Rifaximin

☐ Ciprofloxacin

☐ High-dose vitamin C

Neomycin

15%

Senna

16%

Rifaximin

55%

Ciprofloxacin

7%

High-dose vitamin C

6%

Lactulose and rifaximin are used for the secondary prophylaxis of hepatic encephalopathy

Important for me Less important

A 58-year-old female was admitted for bowel obstruction, treated with bowel and bed rest. She is heterozygous for factor V leiden. While in hospital she has a cardiac arrest but is resuscitated after 2 cycles of chest compressions and 1 shock. She reports no pain on abdominal palpation. Her current medications include pantoprazole 40mg daily, paracetamol 1g QID, morphine 3.5mg S/C PRN & perindopril 5mg day.

Hb	130 g/l
Platelets	140 * 10 ⁹ /l
WBC	6.7 * 10 ⁹ /l

Na ⁺	135 mmol/l
K ⁺	3.4 mmol/l
Creatinine	114 µmol/l

Bilirubin	27 µmol/l
ALP	150 u/l
ALT	3280 u/l
AST	3400 u/l
γGT	180 u/l
APTT	33 sec
INR	1.7
USS Abdomen	Unremarkable

What is the likely cause of her abnormal blood tests?

- ☐ Paracetamol toxicity
- ☐ Alcoholic hepatitis
- ☐ Ischaemic hepatitis
- ☐ Budd-Chiari syndrome
- ☐ Autoimmune hepatitis



Autoimmune liver disease and alcoholic liver diseases present with AST or ALT levels below 1000. A Budd-Chiari syndrome would be visualised on the ultrasound of the abdomen. And while paracetamol toxicity can present with similarly elevated liver function tests, there needs to be a history of ingestion to make it plausible in this scenario.

A 26-year-old man with a history of speech and behavioural problems presents with lethargy. On examination he is noted to have jaundiced sclera. What is the most likely diagnosis?

- ☐ Wiskott-Aldrich syndrome
- ☐ Haemochromatosis
- ☐ Friedreich's ataxia
- ☐ Wilson's disease
- ☐ Acute intermittent porphyria

Wiskott-Aldrich syndrome

9%

Haemochromatosis

10%

Friedreich's ataxia

7%

Wilson's disease

67%

Acute intermittent porphyria

7%

A combination of liver and neurological disease points towards Wilson's disease

Important for me Less important

A 49-year-old male was seen in general practice with a 2 month history of lethargy, polyuria and polydipsia. He had recently been investigated for erectile dysfunction. The patient is abstinent from alcohol, a non smoker and works as an insurance broker. Examination findings showed a slender tanned man with a raised JVP. Heart sounds were normal, but his apex was at the 4th intercostal space mid axillary line. Examination of his abdomen revealed only a 4cm liver edge with pitting oedema to the knees bilaterally.

Which of the following deficiencies is maybe associated with his disease?

- ☐ HFE
- ☐ ATP7B
- ☐ JAK-STAT
- ☐ Glucuronyl transferase
- ☐ Alpha-1 anti-trypsin

HFE	71%
ATP7B	8%
JAK-STAT	5%
Glucuronyl transferase	5%
Alpha-1 anti-trypsin	11%

This 49-year-old male has presented with symptoms of diabetes mellitus, a tan, and erectile dysfunction. This including signs of heart failure and liver disease on examination should trigger the potential diagnosis of haemochromatosis.

ATP7B is the dysfunctional protein associated with Wilson's disease.

JAK-STAT is the mutation associated with primary polycythaemia rubra vera.

Glucuronyl transferase deficiency causes Gilbert's disease.

Alpha-antitrypsin deficiency is a protease that is associated with early onset emphysema and liver cirrhosis.

Iron absorption is regulated in the duodenal crypts. HFE is a protein that regulates iron absorption, it forms a complex at the basolateral membrane that if bound to transferrin + iron at the basolateral membrane of the duodenal crypt cells prevents maturation and consequently absorption of iron in the bowel. The most common form of hereditary haemochromatosis is associated with a mutation in the HFE gene, leading to failure of complex formation and constant maturation of duodenal crypt cells and subsequent unregulated uptake of iron.

A 56-year-old Asian male is being consented for an endoscopic retrograde cholangiopancreatography (ERCP). He is very anxious about the procedure and requests for more information about the common complications of ERCP. He is concerned about peritonitis, which usually occurs secondary to a perforation of the bowel - a rare complication of ERCP. You reassure him that perforation of the bowel, although a very serious complication, is uncommon. However, there are other more common complications of ERCP that he should be aware of.

Which one of the following is the most common complication of ERCP?

- ☐ Significant bleeding
- ☐ Cholangitis
- ☐ Infection
- ☐ Acute pancreatitis
- ☐ Intolerance to sedation

Significant bleeding

7%

Cholangitis

8%

Infection

7%

Acute pancreatitis

73%

Intolerance to sedation

5%

Acute pancreatitis is the most common complication of ERCP

Important for me Less important

Acute pancreatitis due to irritation of the pancreatic duct by the X-ray contrast material or cannula is the most common complication of ERCP.

Although all the other options can be regarded as complications of ERCP, they are not as common as acute pancreatitis.

Dr. Arsem

A 65-year-old man with a history of dyspepsia is found to have a gastric MALT lymphoma on biopsy. What treatment should be offered?

- ☐ Gastrectomy
- ☐ Laser ablation
- ☐ None
- ☐ CHOP chemotherapy
- ☐ *H. pylori* eradication

Gastrectomy

8%

Laser ablation

3%

None

4%

CHOP chemotherapy

14%

H. pylori

eradication

71%

Gastric MALT lymphoma - eradicate *H. pylori*

Important for me

Less important

A 40-year-old man is investigated for abnormal liver function tests. It is decided to perform a liver biopsy. Which one of the following is a contraindication to liver biopsy?

- ☐ ALT of 2,212 iu/l
- ☐ Aspirin therapy
- ☐ Platelet count of $100 \times 10^9/l$
- ☐ Body mass index of 33 kg/m^2
- ☐ Extrahepatic biliary obstruction

A 40-year-old man is investigated for abnormal liver function tests. It is decided to perform a liver biopsy. Which one of the following is a contraindication to liver biopsy?

ALT of 2,212 iu/l	12%
Aspirin therapy	20%
Platelet count of $100 \times 10^9 /l$	20%
Body mass index of 33 kg/m^2	9%
Extrahepatic biliary obstruction	41%

With modern techniques such as ERCP and MRI cholangiography the risks of liver biopsy when there is extra-hepatic biliary obstruction are rarely justified.

A 48-year-old woman is admitted to the ward with jaundice of unknown cause. She noticed it in the mirror that morning. Some of her investigations are shown below:

Hb	117 g/dL
WCC	$9.0 \times 10^9/l$
Total bilirubin	124 $\mu\text{mol/L}$
LDH	75 U/L (100-250 U/L)
Haptoglobin	45 mg/dL (30-200 mg/dL)
ALP	324 $\mu\text{mol/L}$
AST	26 iu/l

Examination of the abdomen reveals a palpable mass in the right upper quadrant and she has yellow discoloration of the sclera and skin. There are no other positive findings. Urine dipstick analysis shows high levels of conjugated bilirubin in the urine.

What is the most likely diagnosis?

- ☐ Biliary colic
- ☐ Haemolytic anaemia
- ☐ Cholangiocarcinoma
- ☐ Gilbert's syndrome
- ☐ Ascending cholangitis

Biliary colic	7%
Haemolytic anaemia	5%
Cholangiocarcinoma	67%
Gilbert's syndrome	13%
Ascending cholangitis	8%

Courvoisier's sign - a palpable gallbladder in the presence of painless jaundice is unlikely to be gallstones

Important for me Less important

This woman has presented with painless jaundice with an obstructive picture on her blood test results. To answer this question, you need to know Courvoisier's sign - a palpable gallbladder in the presence of painless jaundice is unlikely to be gallstones.

Biliary colic - This is not the most appropriate answer. Although this patient has an obstructive picture on her blood test results, biliary colic is, by definition, painful. A patient with biliary colic would not present in this way.

Haemolytic anaemia - This is not the most appropriate answer. Haemolytic anaemia can present with jaundice; however, the blood tests results would be different to this patient - haptoglobin would be reduced and LDH significantly raised.

Cholangiocarcinoma - This is the correct answer. Cholangiocarcinoma is a cancer of ductal cells in the biliary tree. This can be painless and obstruct the bile ducts, causing jaundice with an obstructive picture (raised ALP, conjugated bilirubin in the urine).

Gilbert's syndrome - This is not the most appropriate answer. Gilbert's syndrome is generally a harmless condition which presents only with a raised bilirubin. ALP would not be raised in this condition.

Ascending cholangitis - This is not the most appropriate answer. Ascending cholangitis is an infective condition affecting the bile ducts. The typical triad of symptoms, known as Charcot's triad, is pain in the right upper quadrant, fever and jaundice. In addition, the white cell count would be raised.

Which one of the following may be used to monitor patients with colorectal cancer?

- ☐ CA-125
- ☐ Carcinoembryonic antigen
- ☐ Alpha-fetoprotein
- ☐ CA 19-9
- ☐ CA 15-3



Carcinoembryonic antigen may be used to monitor for recurrence in patients post-operatively or to assess response to treatment in patients with metastatic disease

Which one of the following is not associated with non-alcoholic steatohepatitis?

- ☐ Hyperlipidaemia
- ☐ Obesity
- ☐ Sudden weight loss or starvation
- ☐ Jejunioileal bypass
- ☐ Type 1 diabetes mellitus

Hyperlipidaemia

5%

Obesity

6%

Sudden weight loss or starvation

17%

Jejunioileal bypass

24%

Type 1 diabetes mellitus

47%

Obese T2DM with abnormal LFTs - ? non-alcoholic fatty liver disease

Important for me Less important

A 75-year-old man was admitted 3 days ago after being found at home in his own faeces and urine. Prior to admission he was drinking a 70cl bottle of vodka per day but had not been eating for several weeks. This morning's blood tests showed that he was developing refeeding syndrome.

K+	2.3 mmol/L
Mg2+	0.46 mmol/L
PO4-	0.51 mmol/L

Which of the following is this man most at risk of developing as a consequence of refeeding syndrome?

- ☐ Atrial fibrillation
- ☐ Ventricular fibrillation
- ☐ Complete heart block
- ☐ Torsades-des-pointes
- ☐ Left bundle branch block

Atrial fibrillation

7%

Ventricular fibrillation

15%

Complete heart block

14%

Torsades-des-pointes

62%

Left bundle branch block

3%

Torsades-des-pointes secondary to hypomagnesaemia can result as a consequence of refeeding syndrome

Important for me [Less important](#)

Refeeding syndrome is characterised by electrolyte abnormalities including hypomagnesaemia and hypokalaemia. Severe hypomagnesaemia and hypokalaemia can lead to the development of torsades-des-pointes, a variant of polymorphic ventricular tachycardia with QT prolongation.

The other options are less likely to be precipitated by the electrolyte disturbances described in the question.

A 63-year-old man who smokes heavily presents with dyspepsia. He is tested and found to be positive for *Helicobacter pylori* infection. Despite eradication therapy and a course of lansoprazole his symptoms persist. He therefore has a gastroscopy which shows an ulcer on the duodenal cap.

The following evening he has an episode of haematemesis and collapses. What is the most likely vessel to be responsible?

- ☐ Portal vein
- ☐ Short gastric arteries
- ☐ Superior mesenteric artery
- ☐ Gastroduodenal artery
- ☐ Left gastro-omental artery

Portal vein

4%

Short gastric arteries

7%

Superior mesenteric artery

17%

Gastroduodenal artery

68%

Left gastro-omental artery

5%

He is most likely to have a posteriorly sited duodenal ulcer. These can invade the gastroduodenal artery and present with major bleeding. Although gastric ulcers may invade vessels they do not tend to produce major bleeding of this nature.

Systemic sclerosis

17%

Thyroid disease

10%

Sjogren's syndrome

52%

Rheumatoid arthritis

10%

Systemic lupus erythematosus

11%

Sjogren's syndrome is common in patients with PBC

Important for me Less important

All of the above conditions are associated with primary biliary cirrhosis but Sjogren's syndrome is the most common, being seen in up to 80% of patients

Which one the following disorders is most strongly associated with primary biliary cirrhosis?

- ☐ Systemic sclerosis
- ☐ Thyroid disease
- ☐ Sjogren's syndrome
- ☐ Rheumatoid arthritis
- ☐ Systemic lupus erythematosus

A 54-year-old woman presents with jaundice shortly after being discharged from hospital. Liver function tests are reported as follows:

Albumin	49 g/l
Bilirubin	89 μ mol/l
Alanine transferase (ALT)	66 iu/l
Alkaline phosphatase (ALP)	245 μ mol/l
Gamma glutamyl transferase (γ GT)	529 u/l

Which of the following antibiotics is she most likely to have received?

- ☐ Flucloxacillin
- ☐ Gentamicin
- ☐ Ciprofloxacin
- ☐ Trimethoprim
- ☐ Ceftazidime

Flucloxacillin

57%

Gentamicin

8%

Ciprofloxacin

17%

Trimethoprim

12%

Ceftazidime

7%

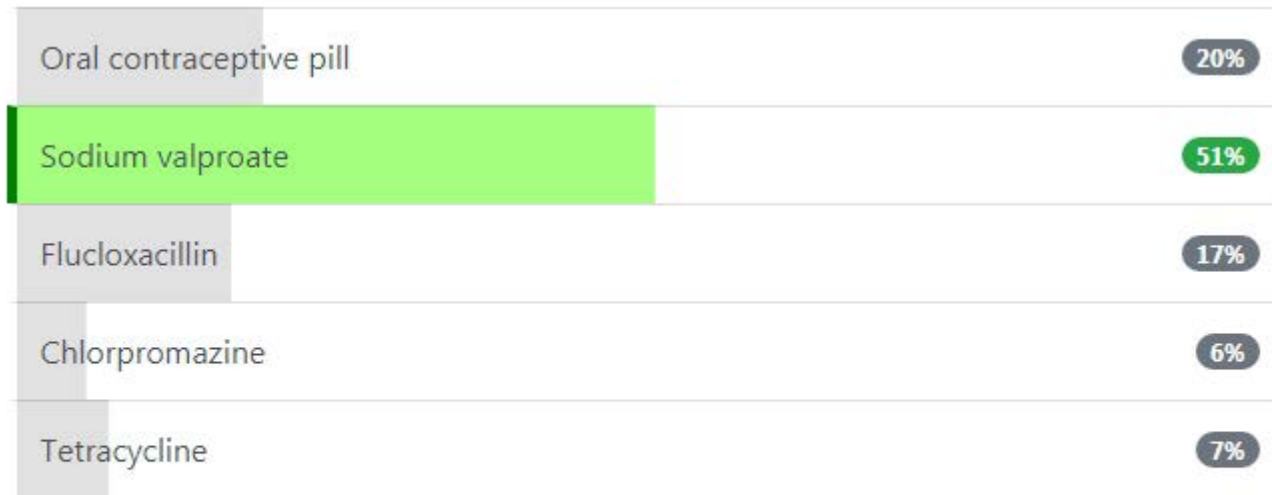
Flucloxacillin is a well recognised cause of cholestasis

Important for me

Less important

A 25-year-old woman develops deranged liver function tests following the introduction of a new drug. Alb 40, Bilirubin 46, ALT 576, ALP 95, yGT 150. Which of the following drugs is the most likely cause?

- ☐ Oral contraceptive pill
- ☐ Sodium valproate
- ☐ Flucloxacillin
- ☐ Chlorpromazine
- ☐ Tetracycline

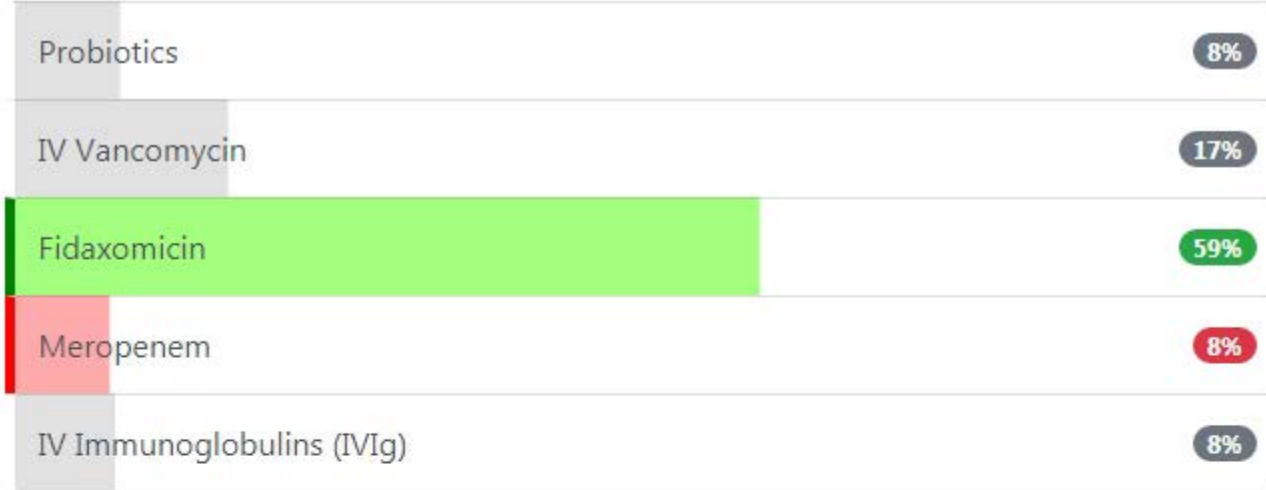


The liver function tests suggest a hepatitis rather than cholestasis. Sodium valproate may be associated with such a picture

A 93-year-old woman is seen on the acute ward round with refractory *Clostridium difficile* infection. She has already received 2 weeks of oral metronidazole, oral vancomycin and intravenous metronidazole.

Which of the following may be implemented as the next line of management?

- ☐ Probiotics
- ☐ IV Vancomycin
- ☐ Fidaxomicin
- ☐ Meropenem
- ☐ IV Immunoglobulins (IVIg)



Fidaxomicin is used for *Clostridium difficile* infections that don't respond to metronidazole/vancomycin

Important for me Less important

Fidaxomicin is a new antibiotic that is useful for *Clostridium difficile* infections. It has a relatively narrow spectrum and may even reduce likelihood of recurrence, compared to oral vancomycin alone.

IV vancomycin has no role in *Clostridium difficile* infections. Probiotics have no valuable evidence at present and IVIg has some evidence and can be used as a very last line. Meropenem may, if anything, worsen the situation.

Dr Assem

You are reviewing a 55-year-old man who has recently been diagnosed with Barrett's oesophagus. This was diagnosed after the patient was referred due to difficult to control symptoms. No evidence of dysplasia was found on biopsies. In terms of risk factor modification, which one of the following has been shown to be most strongly linked to the development of Barrett's oesophagus?

- ☐ Use of NSAIDs
- ☐ Eating smoked fish
- ☐ Alcohol
- ☐ Smoking
- ☐ Gastro-oesophageal reflux disease

You are reviewing a 55-year-old man who has recently been diagnosed with Barrett's oesophagus. This was diagnosed after the patient was referred due to difficult to control symptoms. No evidence of dysplasia was found on biopsies. In terms of risk factor modification, which one of the following has been shown to be most strongly linked to the development of Barrett's oesophagus?



GORD is the single strongest risk factor for the development of Barrett's oesophagus

Important for me Less important

What percentage of patients with Peutz-Jeghers syndrome will have died from a related cancer by the age of 60 years?

☐ 2-3%

☐ 50%

☐ 5-7%

☐ >95%

☐ 10-20%

2-3%

6%

50%

44%

5-7%

10%

>95%

15%

10-20%

25%

A 78-year-old man is being treated on the medical ward with co-amoxiclav for a lower respiratory tract infection. After 3 days he starts to experience loose stools. He is passing 2 - 3 offensive stools per day but is systemically well. What is the first line choice of therapy for the most likely cause of his diarrhoea?

- ☐ Loperamide
- ☐ Ciprofloxacin
- ☐ Vancomycin
- ☐ Intravenous fluids
- ☐ Metronidazole



Metronidazole is the first line antibiotic for use in patients with *Clostridium difficile* infection

Important for me Less important

This patient is being treated with broad-spectrum antibiotics and has developed diarrhoea. *Clostridium difficile* (C. diff) should be top of your differential list. Oral metronidazole is the first line therapy for C. diff.

Clostridium difficile infection is common in patients given broad-spectrum antibiotics - the most well-known antibiotics to be associated with C. diff are cephalosporins, quinolones, clindamycin, co-amoxiclav and tazocin.

Oral metronidazole is the first line antibiotic for use in C.diff. Vancomycin can be used in patients who have not responded to metronidazole or who have severe disease. This patient is systemically well and should be tried on metronidazole first.

Clostridium difficile infection: risk with broad-spectrum antibiotics:

<https://www.nice.org.uk/advice/esmpb1/chapter/Key-points-from-the-evidence>

Public Health England: Updated guidance on the management and treatment of *Clostridium difficile* infection

<https://www.gov.uk/government/uploads/system/uploads/attachmentdata/file/321891/Clo>

An 82-year-old man is recovering from community acquired pneumonia on the older adult ward. He has a background of advanced vascular dementia, his function has declined significantly over the past 6 months and he is unable to cope at home. He is making minimal progress in his recovery, and is not eating and drinking. He is not engaging with the speech and language therapy team. He has no lasting power of attorney or advance decisions. He has no close relatives or friends besides his care home staff.

What is the most appropriate management plan with regard to his nutrition?

- ☐ Insert a percutaneous endoscopic gastrostomy (PEG)
- ☐ Insert a nasogastric (NG) tube
- ☐ Total parenteral nutrition (TPN)
- ☐ Continue to encourage oral food and fluid
- ☐ Stop offering food and fluid unless he asks for it

Insert a percutaneous endoscopic gastrostomy (PEG)	19%
Insert a nasogastric (NG) tube	22%
Total parenteral nutrition (TPN)	14%
Continue to encourage oral food and fluid	40%
Stop offering food and fluid unless he asks for it	6%

PEG insertion is not normally recommended in advanced dementia patients

Important for me Less important

This difficult decision is clearly one that should be taken in conjunction with involvement from the patient's family, carers and multidisciplinary team if possible. Some options are more appropriate than others: refusal of food and fluid is considered a pre-terminal event in dementia patients. 'Artificial nutrition and hydration is rarely appropriate in advanced dementia' (Royal College of Physicians of Edinburgh, 2014). Insertion of PEG tubes in dementia patients has shown no significant increase in short term or long term mortality, and does not improve re-hospitalisation rates. Stopping to offer food and fluid altogether would clearly be inappropriate.

A 62-year-old woman who has recently been treated for ascending cholangitis is referred to hospital due to persistent fever and anorexia. An ultrasound scan reveals the presence of a liver abscess. What is the most appropriate antibiotic therapy to accompany drainage of the abscess?

- ☐ Vancomycin + meropenem
- ☐ Co-amoxiclav + metronidazole
- ☐ Amoxicillin + ciprofloxacin + metronidazole
- ☐ Clindamycin + metronidazole
- ☐ Metronidazole + vancomycin

Vancomycin + meropenem

9%

Co-amoxiclav + metronidazole

21%

Amoxicillin + ciprofloxacin + metronidazole

40%

Clindamycin + metronidazole

15%

Metronidazole + vancomycin

15%

A 43-year-old male attends the Emergency Department with acute abdominal pain. He recently attended his GP for a routine check-up and was found to have the following lipid profile. He does not take any regular medication:

Cholesterol	6.6 mmol/l (<5.0)
Triglycerides	21.4 mmol/l (<2.3)
HDL	1.4 mmol/l (>1.0)
LDL	4.4 mmol/l (<3.0)
Cholesterol/HDL ratio	4.7 mmol/l (<3.5)

In view of this result, what blood test would you like to request as part of his initial workup that could explain his abdominal pain?

- ☐ Reticulocyte count
- ☐ Amylase
- ☐ Creatine kinase
- ☐ Ethanol level
- ☐ Plasma ketone level

Reticulocyte count	2%
Amylase	87%
Creatine kinase	4%
Ethanol level	4%
Plasma ketone level	3%

Hypertriglyceridaemia (with levels > 10 mmol/l) is a risk factor for acute pancreatitis

In a patient with hypertriglyceridaemia and acute abdominal pain, an amylase should be checked to exclude acute pancreatitis. Alcohol and poor glycaemic control are the most common causes for a significantly raised triglyceride (TG) level.

Hypertriglyceridaemia may be primary (familial) or secondary. Secondary causes include:

- high alcohol intake
- type 2 diabetes mellitus
- renal disease
- drugs (cyclosporin, oestrogens, corticosteroids)
- bulimia nervosa
- pregnancy

Management of hypertriglyceridaemia:

For people with a TG concentration > 20 mmol/l that is not a result of excess alcohol or poor glycaemic control, refer for urgent specialist review (i.e at a regional lipid clinic).

For people with a triglyceride concentration between 10 and 20 mmol/L:

- Repeat the triglyceride measurement with a fasting test (following a meal, the chylomicron level rises in the serum which will lead to a rise in triglyceride levels)
- Review for potential secondary causes of hyperlipidaemia
- Address lifestyle factors: encourage weight loss, healthy diet and exercise
- Commence high-potency statins (atorvastatin, rosuvastatin) if unable to address the triglyceride level through lifestyle measures. Monitor liver function tests and creatine kinase in these patients
- Fibrates can also be used (for example fenofibrate). These lower triglycerides through increasing the activity of lipoprotein lipase
- Omega-3-acid ethyl esters and nicotinic acid are other pharmacological options

For people with a triglyceride concentration between 4.5 and 9.9 mmol/L, optimize the management of other CVD risk factors present.

Reference: NICE, October 2015 <http://cks.nice.org.uk/lipid-modification-cvd-prevention#!scenario:1>

A 39-year-old man is investigated for fatigue and arthralgia. The joint pain is worse around his metacarpophalangeal joints and knees. On review of systems he is noted to have polyuria and polydipsia.

An x-ray of his knees reveals chondrocalcinosis.

What is the mode of inheritance of the likely underlying diagnosis?

- ☐ Autosomal recessive
- ☐ X-linked dominant
- ☐ Mitochondrial inheritance
- ☐ Autosomal dominant
- ☐ X-linked recessive

Autosomal recessive	61%
X-linked dominant	4%
Mitochondrial inheritance	6%
Autosomal dominant	20%
X-linked recessive	7%

Haemochromatosis is autosomal recessive

Important for me ~~Less important~~

This patient has typical symptoms of haemochromatosis:

- lethargy
- arthralgia, with evidence of chondrocalcinosis
- diabetes mellitus (polyuria and polydipsia)

Which one of the following antibiotics is most likely to cause pseudomembranous colitis?

- ☐ Cefuroxime
- ☐ Cefalexin
- ☐ Ciprofloxacin
- ☐ Co-amoxiclav
- ☐ Piperacillin-tazobactam

Cefuroxime	32%
Cefalexin	11%
Ciprofloxacin	29%
Co-amoxiclav	24%
Piperacillin-tazobactam	4%

Cephalosporins, not just clindamycin, are strongly linked to *Clostridium difficile*

Important for me Less important

This is a difficult question as both co-amoxiclav and ciprofloxacin are known to cause *Clostridium difficile*. Studies looking at the relative risk (RR) of developing *Clostridium difficile* following antibiotic therapy give the following results (please see the link):

- clindamycin: RR = 31.8
- cephalosporins: RR = 14.9
- ciprofloxacin: RR = 5.0

Cefalexin is a first generation cephalosporin and less associated with *Clostridium difficile* than newer agents such as ceftriaxone

A 35-year-old former intravenous drug user is reviewed in the liver clinic. He has recently been diagnosed with hepatitis C after being found to have abnormal liver function tests. It is decided as part of his work-up that he should be assessed for liver cirrhosis. What is the most appropriate test to perform?

- ☐ MRI liver
- ☐ Liver biopsy
- ☐ Urinary fibroblast quantification
- ☐ Endoscopic ultrasound
- ☐ Transient elastography

MRI liver

12%

Liver biopsy

22%

Urinary fibroblast quantification

8%

Endoscopic ultrasound

11%

Transient elastography

47%

Transient elastography is now the investigation of choice to detect liver cirrhosis

Important for me Less important

NICE recommend that all patients with hepatitis C are assessed for liver cirrhosis.

Which one of the following is not associated with villous atrophy on jejunal biopsy?

- ☐ Tropical sprue
- ☐ Coeliac disease
- ☐ Hypogammaglobulinaemia
- ☐ Familial Mediterranean Fever
- ☐ Whipple's disease

Tropical sprue

8%

Coeliac disease

7%

Hypogammaglobulinaemia

20%

Familial Mediterranean Fever

52%

Whipple's disease

13%

Causes of villous atrophy (other than coeliacs): tropical sprue, Whipple's, lymphoma, hypogammaglobulinaemia

Important for me Less important

A 54-year-old female presents with fatigue and xerostomia. Bloods tests reveal the following:

Hb	13.9 g/dl
WBC	$6.1 \times 10^9/l$
Platelets	$246 \times 10^9/l$
Bilirubin	33 $\mu\text{mol/l}$
ALP	292 u/l
ALT	47 u/l

What is the most likely diagnosis?

- ☐ Systemic lupus erythematosus
- ☐ Infectious mononucleosis
- ☐ Primary biliary cirrhosis
- ☐ Autoimmune hepatitis
- ☐ Primary Sjogren's syndrome

Systemic lupus erythematosus	7%
Infectious mononucleosis	8%
Primary biliary cirrhosis	46%
Autoimmune hepatitis	11%
Primary Sjogren's syndrome	28%

Primary biliary cirrhosis - the **M** rule

- Ig**M**
- anti-**M**itochondrial antibodies, **M**2 subtype
- **M**iddle aged females

Important for me Less important

The dry mouth in this patient is due to sicca syndrome, which occurs in 70% of cases of primary biliary cirrhosis. The raised alkaline phosphatase points towards a diagnosis of primary biliary cirrhosis rather than primary Sjogren's syndrome.

A 26-year-old woman who is known to have type 1 diabetes mellitus presents with a three-month history of diarrhoea, fatigue and weight loss. She has tried excluding gluten from her diet for the past 4 weeks and feels much better. She requests to be tested so that a diagnosis of coeliac disease is confirmed. What is the most appropriate next step?

- ☐ Check her HbA1c
- ☐ No need for further investigation as the clinical response is diagnostic
- ☐ Check anti-endomysial antibodies
- ☐ Arrange a jejunal biopsy
- ☐ Ask her to reintroduce gluten for the next 6 weeks before further testing

Check her HbA1c

2%

No need for further investigation as the clinical response is diagnostic

7%

Check anti-endomysial antibodies

22%

Arrange a jejunal biopsy

9%

Ask her to reintroduce gluten for the next 6 weeks before further testing

60%

Serological tests and jejunal biopsy may be negative if the patient is following a gluten-free diet. The patient should eat some gluten in more than one meal every day for at least 6 weeks before further testing.

A 31-year-old woman presents with symptoms consistent with coeliac disease. Which one of the following tests should be used first-line when screening patients for coeliac disease?

- ☐ Anti-casein antibodies
- ☐ Tissue transglutaminase antibodies
- ☐ Anti-gliadin antibodies
- ☐ Xylose absorption test
- ☐ Anti-endomyseal antibodies

Anti-casein antibodies

2%

Tissue transglutaminase antibodies

83%

Anti-gliadin antibodies

5%

Xylose absorption test

2%

Anti-endomyseal antibodies

9%

Coeliac disease - tissue transglutaminase antibodies are the first-line test

Important for me Less important

Tissue transglutaminase antibodies are recommended as the first-line serological test according to NICE.

A 67-year-old man with a 10-year history of gastro-oesophageal reflux disease is investigated for dysphagia. An endoscopy shows an obstructive lesion highly suspicious of oesophageal cancer. What is the biopsy most likely to show?

- ☐ Squamous cell carcinoma
- ☐ Normal squamous epithelium
- ☐ Adenocarcinoma
- ☐ Leiomyoma
- ☐ Metaplastic columnar epithelium

Squamous cell carcinoma

11%

Normal squamous epithelium

1%

Adenocarcinoma

68%

Leiomyoma

2%

Metaplastic columnar epithelium

17%

Oesophageal adenocarcinoma is associated with GORD or Barrett's

Important for me

Less important

Metaplastic columnar epithelium would be seen with Barrett's but this is not consistent with the obstructive lesion seen on endoscopy.

A 28-year-old woman is diagnosed with irritable bowel syndrome (IBS). She occasionally experiences spasms of pain in the left iliac fossa and has periods of both constipation and loose stools. You are considering drug therapy to provide her with symptomatic relief from the symptoms.

Which one of the following does NICE recommend that we avoid in patients with IBS?

- ☐ Mebeverine
- ☐ Ispaghula
- ☐ Methylcellulose
- ☐ Sterculia
- ☐ Lactulose

Mebeverine

11%

Ispaghula

11%

Methylcellulose

9%

Sterculia

6%

Lactulose

63%

NICE recommend avoiding lactulose in the management of IBS

Important for me

Less important

A 59-year-old female with a history of hypothyroidism presents with fatigue. Blood tests reveal the following:

Hb	9.4 g/dl
MCV	121 fl
Plt	$156 \times 10^9/l$
WBC	$4.3 \times 10^9/l$

What is the most appropriate investigation to perform next?

- ☐ Antral biopsy
- ☐ Bone marrow biopsy
- ☐ Lactate dehydrogenase
- ☐ Intrinsic factor antibodies
- ☐ Barium enema



Macrocytic anaemia in a patient with a history of hypothyroidism points towards a diagnosis of pernicious anaemia

A 46-year-old man is being investigated for indigestion. Jejunal biopsy shows deposition of macrophages containing PAS-positive granules. What is the most likely diagnosis?

- ☐ Bacterial overgrowth
- ☐ Coeliac disease
- ☐ Tropical sprue
- ☐ Whipple's disease
- ☐ Small bowel lymphoma

Bacterial overgrowth

7%

Coeliac disease

6%

Tropical sprue

12%

Whipple's disease

70%

Small bowel lymphoma

4%

Whipple's disease: jejunal biopsy shows deposition of macrophages containing Periodic acid-Schiff (PAS) granules

Important for me **Less important**

A 31-year-old man returns for review. He was diagnosed with an anal fissure around 7 weeks ago and has tried dietary modification, laxatives and topical anaesthetic with little benefit. What is the most appropriate next step?

- ☐ Oral bisacodyl
- ☐ Oral calcium channel blocker
- ☐ Topical steroid
- ☐ Buccal glyceryl trinitrate prior to defecation
- ☐ Topical glyceryl trinitrate

Oral bisacodyl

5%

Oral calcium channel blocker

5%

Topical steroid

7%

Buccal glyceryl trinitrate prior to defecation

8%

Topical glyceryl trinitrate

76%

Anal fissure - topical glyceryl trinitrate

Important for me Less important

Each one of the following is a risk factor for gastric cancer, except:

- ☐ Smoking
- ☐ Blood group O
- ☐ Nitrates in diet
- ☐ Pernicious anaemia
- ☐ *H. pylori* infection

Smoking

4%

Blood group O

70%

Nitrates in diet

8%

Pernicious anaemia

9%

H. pylori

infection

10%

Which one of the following medications is least associated with dyspepsia?

☐ Isosorbide mononitrate

☐ Prednisolone

☐ Aminophylline

☐ Atenolol

☐ Amlodipine

Isosorbide mononitrate

17%

Prednisolone

7%

Aminophylline

15%

Atenolol

40%

Amlodipine

21%

Dr. Ssem

A 46-year-old male complains of aching in his hands and feet for several months. He also reports diarrhoea, colicky abdominal pain, night sweats and weight loss of 6kg over the last two months. On examination, his abdomen is soft and non-tender but his face appears hyperpigmented and he has bilateral cervical and inguinal lymphadenopathy.

What is the most likely cause?

- ☐ Ulcerative colitis
- ☐ Peritoneal tuberculosis
- ☐ *Tropheryma whipplei*
- ☐ Wilson's disease
- ☐ Giardiasis

Ulcerative colitis	5%
Peritoneal tuberculosis	22%
<i>Tropheryma whipplei</i>	55%
Wilson's disease	14%
Giardiasis	4%

The combination of GI malabsorption and systemic features in a middle-aged man point to a diagnosis of Whipple's disease.

Explanation for other options:

- 1. Ulcerative colitis would be more likely to present with diarrhoea with blood and mucus. Also, lymphadenopathy and hyperpigmentation are not common extraintestinal features of UC.
- 2. Peritoneal TB is possible with the history of abdominal pain and lymphadenopathy, but there are no pointers in the history to suggest TB and there would usually be some ascites present.
- 4. Wilson's disease may be asymptomatic or may present with signs of liver disease or neurological signs.
- 5. Giardiasis may cause chronic GI upset but is not associated with lymphadenopathy, arthralgia or skin changes.

Which one of the following foodstuff contains the most energy per unit weight?

☐ Pasta

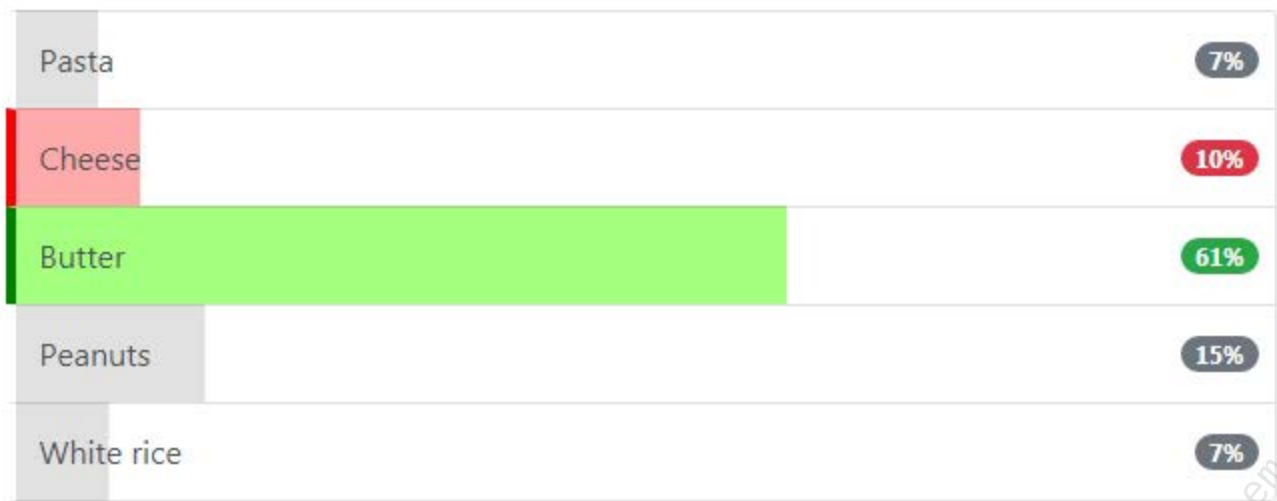
☐ Cheese

☐ Butter

☐ Peanuts

☐ White rice

Dr Assem



Butter is a type of fat and therefore contains the most energy.

A 23-year-old female with a history of diarrhoea and weight loss has a colonoscopy to investigate her symptoms. A biopsy is taken and reported as follows:

Pigment laden macrophages

What is the most likely diagnosis?

- ☐ Intestinal melanoma
- ☐ Haemochromatosis
- ☐ Ulcerative colitis
- ☐ Laxative abuse
- ☐ Colorectal cancer

Intestinal melanoma

13%

Haemochromatosis

18%

Ulcerative colitis

7%

Laxative abuse

61%

Colorectal cancer

2%

Diarrhoea - biopsy shows pigment laden macrophages = laxative abuse

Important for me

Less important

Which of the following is not a recognised complication of coeliac disease?

☐ Hypersplenism

☐ Osteoporosis

☐ Lactose intolerance

☐ Oesophageal cancer

☐ Subfertility

Hypersplenism

59%

Osteoporosis

5%

Lactose intolerance

9%

Oesophageal cancer

16%

Subfertility

10%

Hypo-, not hypersplenism is seen in coeliac disease

Dr Assef

Which one of the following is least associated with the development of colorectal cancer in patients with ulcerative colitis?

- ☐ Unremitting disease
- ☐ Disease duration > 10 years
- ☐ Onset before 15 years old
- ☐ Poor compliance to treatment
- ☐ Disease confined to the rectum

Unremitting disease

11%

Disease duration > 10 years

8%

Onset before 15 years old

9%

Poor compliance to treatment

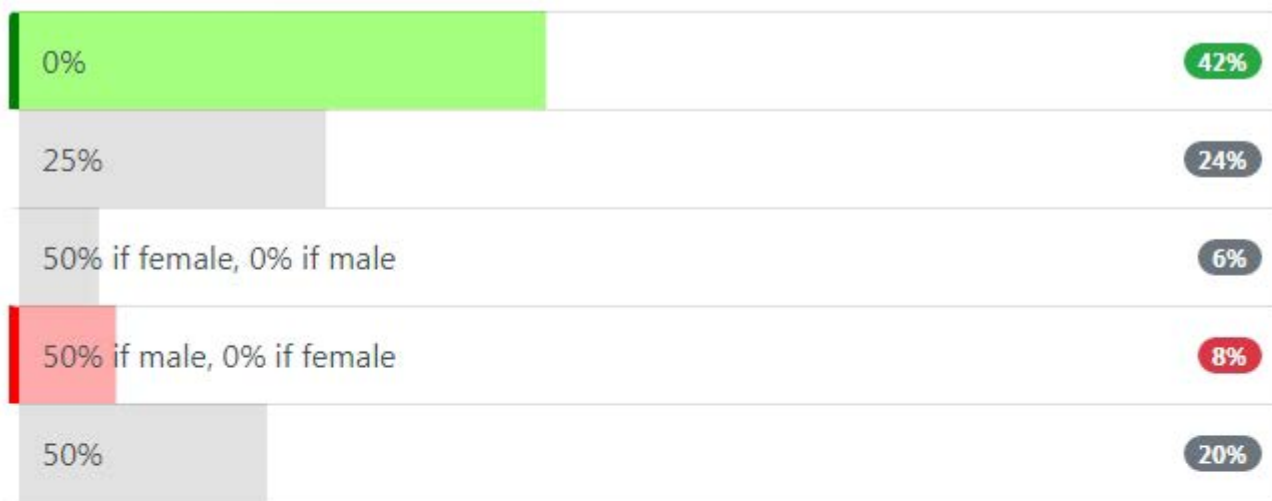
6%

Disease confined to the rectum

67%

A 35-year-old man is investigated for lethargy, arthralgia and deranged liver function tests. He is eventually diagnosed as having hereditary hemochromatosis. His wife has a genetic test which shows she is not a carrier of the disease. What is the chance his child will develop haemochromatosis?

- ☐ 0%
- ☐ 25%
- ☐ 50% if female, 0% if male
- ☐ 50% if male, 0% if female
- ☐ 50%



Haemochromatosis is autosomal recessive

Important for me Less important

Haemochromatosis is an autosomal recessive condition. If one of the parents has haemochromatosis (i.e. is homozygous) and the other is not a carrier/affected then all the children will inherit one copy of the gene from the affected parent and hence will be carriers.

You wish to screen a patient for hepatitis B infection. Which one of the following is the most suitable test to perform?

- ☐ HBcAg
- ☐ HBsAg
- ☐ Hepatitis B viral load
- ☐ anti-HBs
- ☐ HBeAg

HBcAg

8%

HBsAg

76%

Hepatitis B viral load

4%

anti-HBs

9%

HBeAg

4%

A positive anti-HBs would imply immunity through either previous immunisation or disease. A positive HBsAg implies either acute or chronic hepatitis B.

A 31-year-old man with a known history of alcoholic liver disease is reviewed following a suspected oesophageal variceal haemorrhage. He has been resuscitated and intravenous terlipressin has been given. His blood pressure is now 104/60 mmHg and his pulse is 84/min. What is the most appropriate intervention?

- ☐ Transjugular Intrahepatic Portosystemic Shunt
- ☐ Surgical referral
- ☐ Endoscopic variceal band ligation
- ☐ Sengstaken-Blakemore tube
- ☐ Endoscopic sclerotherapy

Transjugular Intrahepatic Portosystemic Shunt

5%

Surgical referral

3%

Endoscopic variceal band ligation

82%

Sengstaken-Blakemore tube

4%

Endoscopic sclerotherapy

6%

Which one of the following statements regarding hepatitis B and pregnancy is correct?

- ☐ Without intervention the vertical transmission rate is around 3%
- ☐ Only at risk groups should be screened for hepatitis B during pregnancy
- ☐ Around 30% of mothers with hepatitis B develop pre-eclampsia
- ☐ It is safe for a mother with hepatitis B to breastfeed her newborn
- ☐ All pregnant women with hepatitis B should take oral ribavirin in the last trimester of pregnancy

Without intervention the vertical transmission rate is around 3%

13%

Only at risk groups should be screened for hepatitis B during pregnancy

5%

Around 30% of mothers with hepatitis B develop pre-eclampsia

3%

It is safe for a mother with hepatitis B to breastfeed her newborn

61%

All pregnant women with hepatitis B should take oral ribavirin in the last trimester of pregnancy

17%

Without intervention the vertical transmission rate is around 20%, which increases to 90% if the woman is positive for HBeAg.

A 54-year-old female presents with a 3 month history of dysphagia affecting both food and liquids from the start, along with occasional symptoms of heartburn. What is the most likely underlying diagnosis?

- ☐ Pharyngeal pouch
- ☐ Gastric adenocarcinoma
- ☐ Benign stricture
- ☐ Oesophageal cancer
- ☐ Achalasia



Dysphagia affecting both solids and liquids from the start - think achalasia

Important for me Less important

This is a classic history of achalasia with dysphagia affecting both solids and liquids from the start.

You are reviewing a 38-year-old man that you saw last week with an anal fissure caused by constipation and straining. He has no systemic symptoms and is otherwise well. He has been using the lidocaine ointment (which you prescribed last week) before every stool but he is still troubled by severe rectal pain when he has his bowels open. He is still passing bright red blood with every stool. The pain continues to burn for 30 minutes after each stool. His stools are now soft as he is taking regular lactulose and has modified his diet.

The next option for this man is:

- ☐ Refer routinely to a colorectal surgeon
- ☐ Refer urgently to a colorectal surgeon
- ☐ Prescribe topical GTN ointment for 6-8 weeks and review if still not healed
- ☐ Prescribe topical diltiazem 2%
- ☐ Prescribe hydrocortisone ointment for 7 days

Refer routinely to a colorectal surgeon

12%

Refer urgently to a colorectal surgeon

11%

Prescribe topical GTN ointment for 6-8 weeks and review if still not healed

63%

Prescribe topical diltiazem 2%

8%

Prescribe hydrocortisone ointment for 7 days

6%

Topical GTN is the first line treatment for a chronic anal fissure

Important for me Less important

This patient has an anal fissure which has not settled for one week and the use of lidocaine ointment. The next step is to consider prescribing rectal glyceryl trinitrate (GTN) 0.4% ointment (provided there are no contraindications) to relieve pain and aid healing. Advise the person to use it twice a day for 6–8 weeks. Therefore, the correct answer is option 3.

He does not need a referral to the colorectal surgeons at this point as he has no symptoms of a serious underlying pathology. If the GTN does not work after 6-8 weeks you could consider referring him to the surgeons. Therefore, options 1 and 2 are wrong.

Topical diltiazem is occasionally prescribed following specialist advice. Therefore, option 4 is wrong.

Hydrocortisone ointment is not a recommended treatment for an anal fissure. Therefore, option 5 is wrong.

Dr. Assem

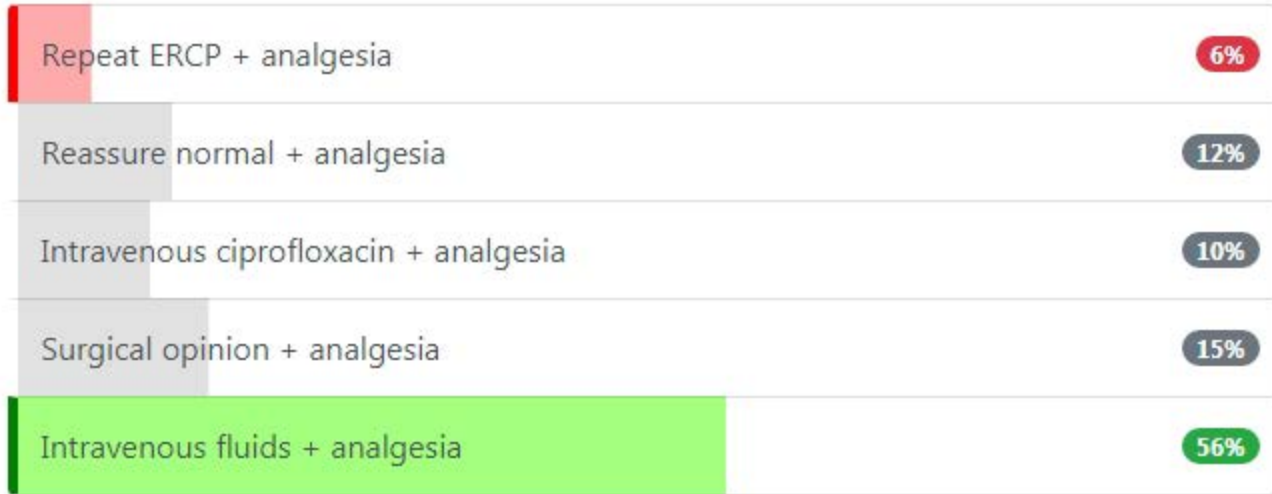
A 54-year-old man develops central abdominal pain a few hours after having an Endoscopic Retrograde Cholangiopancreatography (ERCP) performed. Investigations reveal the following:

Amylase	545 u/dl
---------	----------

Erect chest x-ray	Normal heart and lungs. No free air noted
-------------------	---

What is the most appropriate management?

- ☐ Repeat ERCP + analgesia
- ☐ Reassure normal + analgesia
- ☐ Intravenous ciprofloxacin + analgesia
- ☐ Surgical opinion + analgesia
- ☐ Intravenous fluids + analgesia



This patient has developed acute pancreatitis following ERCP and should be treated with intravenous fluids and analgesia.

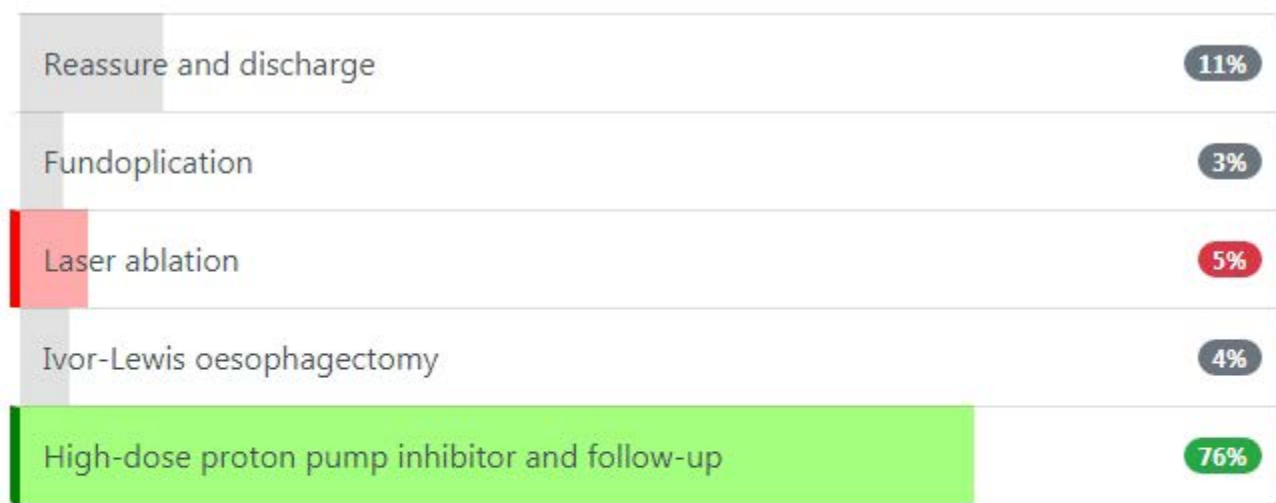
Quinolones have not been shown to be beneficial in acute pancreatitis.

A 54-year-old man with a long history of heartburn has an endoscopy to investigate his symptoms. A biopsy is taken from an abnormal area of mucosa in the lower oesophagus and reported as follows:

Non-dysplastic columnar-lined oesophagus

What is the most suitable management?

- ☐ Reassure and discharge
- ☐ Fundoplication
- ☐ Laser ablation
- ☐ Ivor-Lewis oesophagectomy
- ☐ High-dose proton pump inhibitor and follow-up



The 2005 British Society of Gastroenterology guidelines state that high-dose proton pump inhibitor therapy is first-line treatment in such patients. There is yet insufficient evidence to support the use of endoscopic ablation.

A 44-year-old man is diagnosed with a right-sided colon cancer. He has a strong family history of colorectal and ovarian cancer. Genetic tests confirm a diagnosis of hereditary non-polyposis colorectal cancer (HNPCC) due to a defect in the MSH2 gene. What is the function of this gene?

- ☐ Signal transduction
- ☐ Apoptosis regulation
- ☐ Epidermal growth factor receptor
- ☐ DNA mismatch repair
- ☐ Regulatory GTPase

Signal transduction

7%

Apoptosis regulation

23%

Epidermal growth factor receptor

14%

DNA mismatch repair

53%

Regulatory GTPase

4%

A 54-year-old man who is known to have gastric cancer is reviewed in clinic. He asks you about a rash he has developed. Which of the following skin disorders is most associated with gastric cancer?

- ☐ Erythema gyratum repens
- ☐ Necrolytic migratory erythema
- ☐ Sweet's syndrome
- ☐ Acquired ichthyosis
- ☐ Acanthosis nigricans

Erythema gyratum repens

9%

Necrolytic migratory erythema

11%

Sweet's syndrome

5%

Acquired ichthyosis

6%

Acanthosis nigricans

69%

A 50-year-old alcoholic who drinks 20 units of alcohol per day comes to the Emergency department complaining of chronic epigastric pain and diarrhoea. He is unable to maintain his weight and complains that he is wasting away. On examination his blood pressure is 125/85 mmHg, pulse is 75 beats per minute and regular. Cardiovascular and respiratory systems are unremarkable. His abdomen is soft, there is mild epigastric tenderness. His body mass index is 20 kg/m².

Investigations:

Hb	101 g/l
Platelets	95 * 10 ⁹ /l
WBC	7.2 * 10 ⁹ /l
Na ⁺	139 mmol/l
K ⁺	3.7 mmol/l
Urea	6.1 mmol/l
Creatinine	82 µmol/l
Albumin	24 mmol/l
Calcium	1.99 mmol/l

You suspect chronic pancreatitis, which of the following tests would be most useful in confirming the diagnosis?

- ☐ Faecal calprotectin
- ☐ Faecal elastase
- ☐ Faecal fat estimation
- ☐ SeHCAT test
- ☐ Small bowel follow through

Faecal calprotectin

8%

Faecal elastase

59%

Faecal fat estimation

14%

SeHCAT test

17%

Small bowel follow through

2%

Faecal elastase is a useful test of exocrine function in chronic pancreatitis

Important for me Less important

Elastase 1 is a protease synthesised by pancreatic acinar cells and secreted into the duodenum. It is not degraded during transit and is concentrated in the faeces. Measurement of stool Elastase 1 allows the diagnosis or exclusion of pancreatic exocrine insufficiency. A level less than 100 $\mu\text{g/g}$ of stool indicates severe pancreatic insufficiency, levels of 100-200 $\mu\text{g/g}$ indicate mild to moderate pancreatic insufficiency.

Faecal calprotectin is used as a measure of bowel mucosal inflammation, and can be helpful in the diagnosis of inflammatory bowel disease. Faecal fat estimation can indicate malabsorption and be useful in the diagnosis of small bowel disease, although it is less specific versus elastase measurement, and more difficult to collect. SeHCAT testing is used for ruling out bile acid diarrhoea, and small bowel follow through is only useful for demonstrating abnormal anatomy.

Dr Assem

A 37-year-old woman who has a BMI of 44 kg/m^2 undergoes a Roux-en-Y gastric bypass. Of which vitamin/mineral is she most likely to require supplementation?

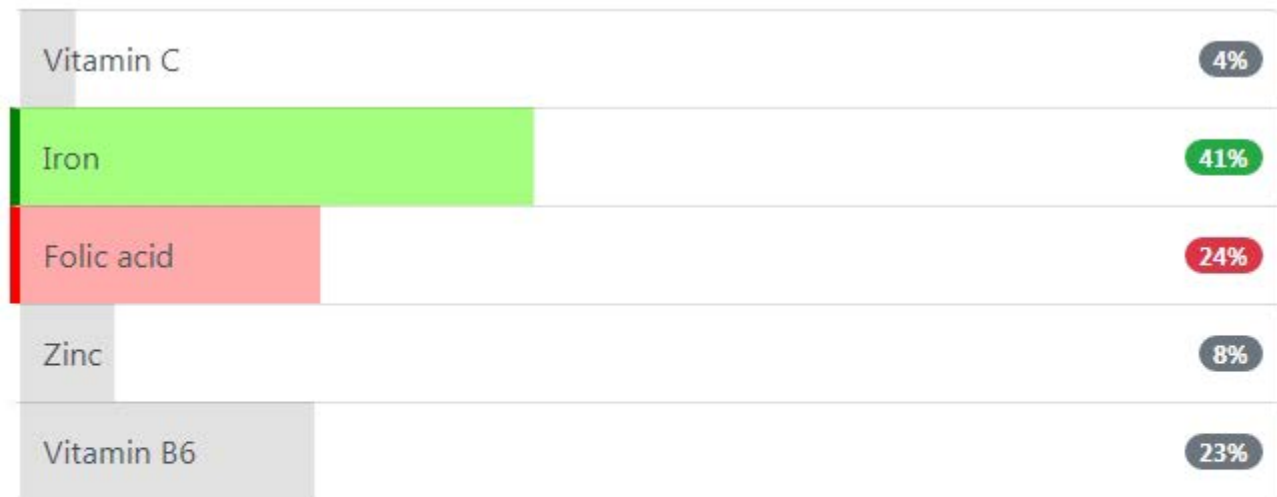
☐ Vitamin C

☐ Iron

☐ Folic acid

☐ Zinc

☐ Vitamin B6



The duodenum is the primary site of absorption for both iron and calcium. All gastric bypass operations bypass the duodenum. Nearly all menstruating women will therefore require iron supplementation.

A 29-year-old man is reviewed. Four weeks ago he presented with a one month history of bloody diarrhoea. He was previously fit and well prior to this episode. When initially reviewed he was passing on average four loose stools a day with some visible blood. He was haemodynamically stable with no fever and bloods showed the following:

Hb	15.2 g/dl
Platelets	$298 \times 10^9/l$
WBC	$8.6 \times 10^9/l$
CRP	15 mg/l

Colonoscopy showed extensive inflammatory changes consistent with ulcerative colitis. He was started on oral mesalazine and a review appointment was made for today. Unfortunately there has been no significant change in his symptoms. He is still passing around four bloody stools a day although he remains systemically well. What is the most appropriate course of action?

- ☐ Add oral prednisolone
- ☐ Stop oral mesalazine and start oral prednisolone
- ☐ Rectal corticosteroids
- ☐ Add oral methotrexate
- ☐ Add oral azathioprine

Add oral prednisolone

46%

Stop oral mesalazine and start oral prednisolone

11%

Rectal corticosteroids

14%

Add oral methotrexate

8%

Add oral azathioprine

21%

This patient with mild/moderate ulcerative colitis has not responded to the appropriate first-line therapy of oral aminosalicylates. He should therefore be offered oral prednisolone to help induce remission.

Dr Assem

Which one of the following features is least associated with ulcerative colitis?

- ☐ Inflammatory cell infiltrate in the lamina propria
- ☐ Pseudopolyps
- ☐ Non-caseating granulomas
- ☐ Depletion of goblet cells
- ☐ Inflammation confined to the mucosa and submucosa

Inflammatory cell infiltrate in the lamina propria

20%

Pseudopolyps

6%

Non-caseating granulomas

52%

Depletion of goblet cells

10%

Inflammation confined to the mucosa and submucosa

11%

A 22-year-old male blood donor is noted to have the following blood results:

Bilirubin	41 $\mu\text{mol/L}$
ALP	84 U/L
ALT	23 U/L
Albumin	41 g/L
Dipstick urinalysis	No bilirubinuria

He has recently complained of coryzal symptoms and a non-productive cough. What is the most likely diagnosis?

- ☐ Gilbert's syndrome
- ☐ Dubin-Johnson syndrome
- ☐ Rotor syndrome
- ☐ Hepatitis C infection
- ☐ Infectious mononucleosis

Gilbert's syndrome

69%

Dubin-Johnson syndrome

7%

Rotor syndrome

5%

Hepatitis C infection

3%

Infectious mononucleosis

16%

An isolated rise in bilirubin in response to physiological stress is typical of Gilbert's syndrome

Important for me [Less important](#)

An isolated hyperbilirubinaemia in a 22-year-old male is likely to be secondary to Gilbert's syndrome. The normal dipstick urinalysis excludes Dubin-Johnson and Rotor syndrome as these both produce a conjugated bilirubinaemia. Viral infections are common triggers for a rise in the bilirubin in patients with Gilbert's

Which of the following anti-retroviral drugs is most characteristically associated with pancreatitis?

☐ Zidovudine

☐ Didanosine

☐ Indinavir

☐ Ritonavir

☐ Nevirapine

Zidovudine

20%

Didanosine

53%

Indinavir

10%

Ritonavir

9%

Nevirapine

8%

Ritonavir may cause acute pancreatitis but this is not as common as with didanosine therapy

A 48-year-old male with known liver cirrhosis presents to the emergency department with malaise and abdominal tenderness. On examination he has obvious jaundice and tender hepatomegaly. He mentions that he drinks heavily - around 35 units of alcohol per week.

His blood results are as follows:

Hb	135 g/l
Platelets	$140 \times 10^9/l$
Neutrophils	$23 \times 10^9/l$

Bilirubin	46 $\mu\text{mol/l}$
ALP	120 u/l
ALT	342 u/l
Albumin	34 g/l

You suspect a diagnosis of alcoholic hepatitis.

Which is the most appropriate treatment for acute severe alcoholic hepatitis, as determined by the Maddrey discriminant function?

- ☐ No treatment required
- ☐ IV antibiotics
- ☐ Liver transplant
- ☐ Prednisolone
- ☐ Chlordiazepoxide



Corticosteroids are used in the management of severe alcoholic hepatitis

Important for me Less important

Corticosteroids are the recommended treatment for severe alcoholic hepatitis (determined by a Maddrey discriminant function value >32). The STOPAH trial (Steroids or Pentoxifylline for Alcoholic Hepatitis) determined that treatment with steroids reduced mortality by 39% at 28 days. The typical regimen is prednisolone 40mg/day for 28 days.

IV antibiotics may be used if there is concurrent infection. However, as the basis of alcoholic hepatitis is non-infectious, antibiotics will not treat the hepatitis itself.

Liver transplant is a contentious issue in alcoholic hepatitis as almost all patients with alcoholic hepatitis are active alcohol drinkers at the time of presentation.

Chlordiazepoxide is used in the treatment of alcohol withdrawal.

A 25-year-old female currently under investigation for secondary amenorrhoea presents with jaundiced sclera. On examination spider naevi are present along with tender hepatomegaly. Blood tests show:

Hb	11.6 g/dl
Plt	$145 \times 10^9/l$
WCC	$6.4 \times 10^9/l$
Albumin	33 g/l
Bilirubin	78 $\mu\text{mol/l}$
ALT	245 iu/l

What is the most likely diagnosis?

- ☐ Haemochromatosis
- ☐ Wilson's disease
- ☐ Primary biliary cirrhosis
- ☐ Autoimmune hepatitis
- ☐ Primary sclerosing cholangitis

Haemochromatosis

16%

Wilson's disease

6%

Primary biliary cirrhosis

16%

Autoimmune hepatitis

50%

Primary sclerosing cholangitis

11%

The combination of deranged LFTs combined with secondary amenorrhoea in a young female strongly suggest autoimmune hepatitis

A 75-year-old man who lives alone is admitted to hospital with community-acquired pneumonia (CAP) and acute kidney injury (AKI) secondary to dehydration. He is treated with IV fluids and antibiotics for his pneumonia and his condition improved. Unfortunately, his discharge is delayed due to issues restarting his care package. He completes his course of antibiotics for his CAP but develops severe non-bloody diarrhoea and abdominal pain. He spikes a temperature of 38.1°C, is tachycardic (HR 125bpm) and hypotensive, requiring IV fluids. Bloods show a white cell count (WCC) of 15.5 ($10^9/l$). There are no signs of peritonism. Abdominal imaging shows a very dilated colon and thumb-printing sign. A stool sample is positive for C.diff toxin.

Which of the following is the best drug regime for the treatment of his diarrhoea?

- ☐ Loperamide
- ☐ Oral metronidazole
- ☐ IV vancomycin and oral metronidazole
- ☐ Oral vancomycin and IV metronidazole
- ☐ IV vancomycin

Loperamide	1%
Oral metronidazole	26%
IV vancomycin and oral metronidazole	12%
Oral vancomycin and IV metronidazole	58%
IV vancomycin	4%

In life-threatening *Clostridium difficile* infection treatment is with ORAL vancomycin and IV metronidazole

Important for me Less important

This gentleman has developed *Clostridium difficile* (C.diff) infection secondary to his recent antibiotic treatment for a community-acquired pneumonia (CAP). Don't baulk at the background to this scenario, just identify the pertinent facts; diarrhoea in the context of recent antibiotic treatment and positive C.diff toxin in the stool. Unfortunately, scenarios like this are encountered more and more often in clinical practice.

He has life-threatening C.diff infection (as indicated by features such as his hypotension and radiological evidence of toxic megacolon).

Drug treatment for life-threatening C.diff infection is with oral vancomycin + IV metronidazole.

1. Incorrect- Loperamide can be used in uncomplicated cases of diarrhoea to reduce stool frequency but would be completely inappropriate in the context of a severe/life-threatening C.diff infection
2. Incorrect- oral metronidazole would be a suitable choice for a first episode of mild to moderate C.diff infection
3. Incorrect- Generally as the proliferation of bacteria in C.diff infection is within the bowel drug treatments are actually more effective when administered orally. With more severe infection oral vancomycin given instead of oral metronidazole. In life-threatening infection oral vancomycin is given with IV metronidazole.
4. Correct- in life-threatening C.diff infection as in this scenario, treatment is with a combination of oral vancomycin and IV metronidazole
5. Incorrect- IV vancomycin is not a recommended treatment for C.diff infection of any severity

Which one of the following is most suggestive of Wilson's disease?

- ☐ Reduced hepatic copper concentration
- ☐ Reduced 24hr urinary copper excretion
- ☐ Increased skin pigmentation
- ☐ Reduced serum caeruloplasmin
- ☐ Increased serum copper

Reduced hepatic copper concentration

4%

Reduced 24hr urinary copper excretion

11%

Increased skin pigmentation

6%

Reduced serum caeruloplasmin

64%

Increased serum copper

15%

Wilson's disease - serum caeruloplasmin is **decreased**

Important for me Less important

A 55-year-old woman with a history of alcoholic liver disease is reviewed in clinic. She has advanced cirrhosis and has started to accumulate ascites. An ascitic tap was recently performed and showed a protein concentration of 12 g/L but no evidence of any organisms.

What is the most appropriate management concerning the risk of spontaneous bacterial peritonitis?

- ☐ No antibiotic prophylaxis is indicated
- ☐ Oral penicillin
- ☐ Oral ciprofloxacin
- ☐ Oral azithromycin
- ☐ Oral doxycycline

No antibiotic prophylaxis is indicated

39%

Oral penicillin

6%

Oral ciprofloxacin

46%

Oral azithromycin

4%

Oral doxycycline

5%

Patients with ascites (and protein concentration ≤ 15 g/L) should be given oral ciprofloxacin or norfloxacin as prophylaxis against spontaneous bacterial peritonitis

Important for me Less important

Which one of the following statements regarding hepatocellular carcinoma is correct?

- ☐ Diabetes mellitus is a risk factor
- ☐ Screening has not been shown to be effective
- ☐ Bevacizumab may be used for advanced cases
- ☐ The incidence is significantly higher in women
- ☐ Alcohol excess is the most common underlying cause worldwide

Diabetes mellitus is a risk factor

31%

Screening has not been shown to be effective

14%

Bevacizumab may be used for advanced cases

20%

The incidence is significantly higher in women

7%

Alcohol excess is the most common underlying cause worldwide

28%

A 70-year-old man who is known to have atrial fibrillation presents with abdominal pain and rectal bleeding. A diagnosis of ischaemic colitis is suspected. Which part of the colon is most likely to be affected?

- ☐ Hepatic flexure
- ☐ Descending colon
- ☐ Splenic flexure
- ☐ Ascending colon
- ☐ Rectum

Hepatic flexure

7%

Descending colon

11%

Splenic flexure

69%

Ascending colon

9%

Rectum

4%

A 50-year-old lady is readmitted 3 days after a laparoscopic cholecystectomy for symptomatic gallstones. She complains of frequent and uncontrollable diarrhoea. Abdominal examination eludes no features other than a laparoscopic scar.

Her operation and initial recovery were unremarkable.

In view of the history, what treatment is she likely to need?

- ☐ Co-Amoxiclav
- ☐ Pancreatin
- ☐ Lansoprazole
- ☐ Cholestyramine
- ☐ Azathioprine



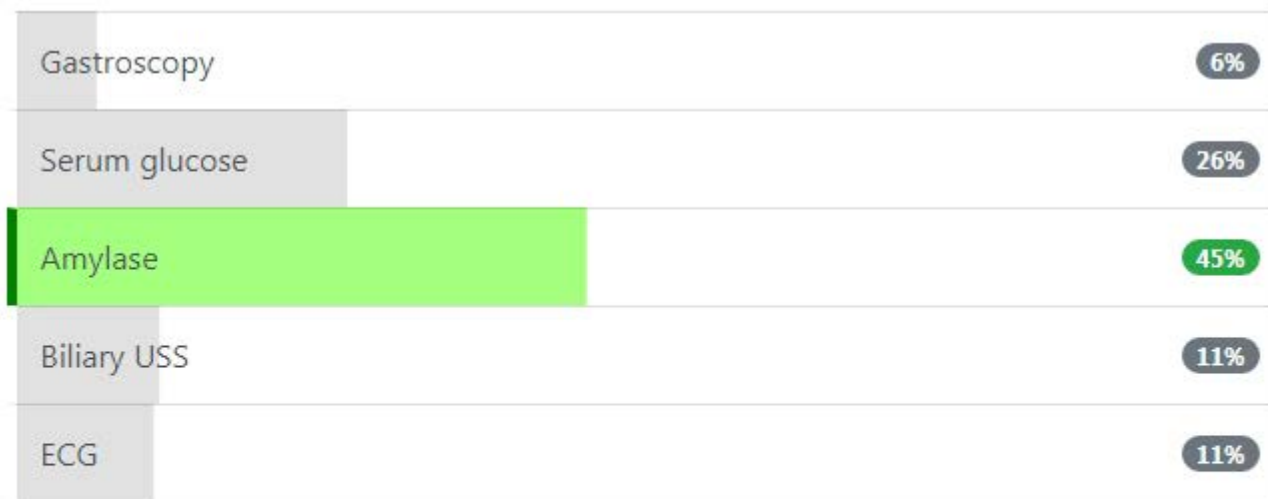
Post-cholecystectomy syndrome is a recognised complication of cholecystectomies. Typically symptoms of dyspepsia, vomiting, pain, flatulence and diarrhoea occur in up to 40% patients post surgery.

The pathology behind the syndrome isn't completely clear, however there is some association with remnant stones and biliary injury. Pain is often due to sphincter of Oddi dysfunction and the development of surgical adhesions.

Management is often difficult, but often involves a low-fat diet and the introduction of bile acid sequestrants, such as Cholestyramine, to bind the excess bile acids and thus preventing lower gastrointestinal signs. Proton-pump inhibitors like Lansoprazole do play a role, if the patient is complaining of dyspeptic like symptoms. Antibiotics and pancreatic enzyme replacements play no part in management.

A 45-year-old man is admitted to the Emergency Department with severe abdominal pain. He smokes 20 cigarettes a day and drinks approximately 50 units of alcohol per week. He also complains of sudden deterioration in vision. Fundoscopy reveals shows multiple micro infarcts (cotton wool spots). Which investigation would best confirm the most likely diagnosis?

- ☐ Gastroscopy
- ☐ Serum glucose
- ☐ Amylase
- ☐ Biliary USS
- ☐ ECG



The cotton wool spots seen on fundoscopy represents Purtscher retinopathy. This condition may be seen following head trauma and in conditions such as acute pancreatitis, fat embolisation, amniotic fluid embolisation, and vasculitic diseases

The action of which one of the following brush border enzymes results in the formation of glucose and galactose?

☐ Dipeptidase

☐ α -dextrinase

☐ Maltase

☐ Lactase

☐ Sucrase

Dipeptidase

7%

A-dextrinase

4%

Maltase

20%

Lactase

56%

Sucrase

14%

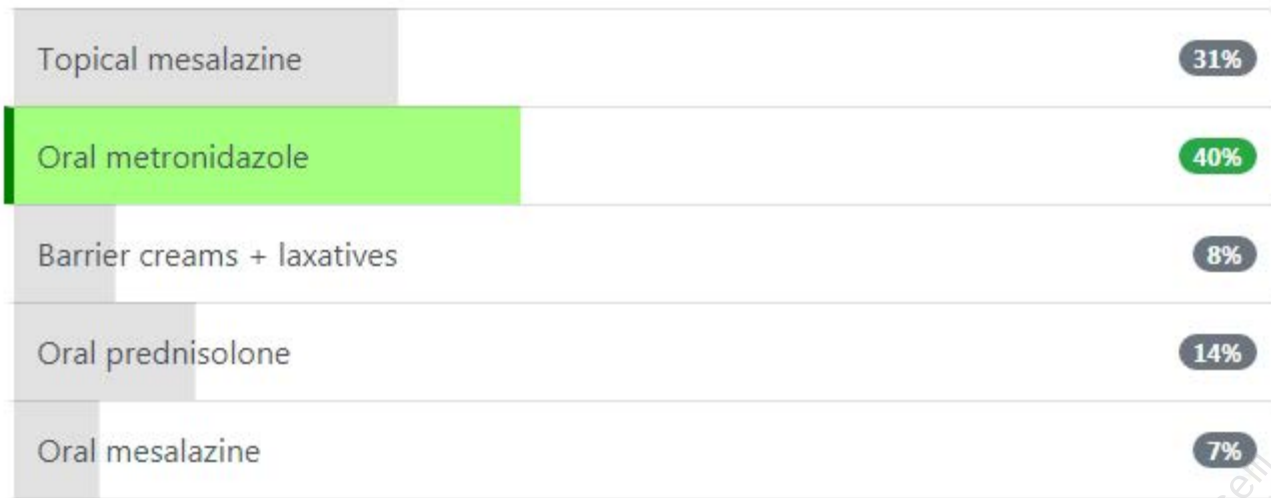
Brush border enzymes:

- maltase: glucose + glucose
- sucrase: glucose + fructose
- lactase: glucose + galactose

Important for me Less important

A 25-year-old man with a history of Crohn's disease is reviewed in clinic. Over the past week he has developed painful perianal ulcers. On examination numerous shallow ulcers can be seen with a small number of skin tags. What is the most appropriate first-line treatment?

- ☐ Topical mesalazine
- ☐ Oral metronidazole
- ☐ Barrier creams + laxatives
- ☐ Oral prednisolone
- ☐ Oral mesalazine



Please see the British Society of Gastroenterology guidelines for more details.

Where do the majority of VIPomas arise from?

☐ Small intestine

☒ Pituitary

☐ Pancreas

☐ Antrum of stomach

☐ Pylorus of stomach

Small intestine

31%

Pituitary

3%

Pancreas

47%

Antrum of stomach

11%

Pylorus of stomach

7%

A 37-year-old lady is brought into the emergency department after being assaulted with a bottle. She reports being struck on the abdomen multiple times and reports pain across her entire abdomen. On clinical examination there is bruising across the abdomen however no distension, no guarding and no active sites of bleeding.

Her initial observations as handed over from the paramedics are listed below:

	30 mins ago	15 mins ago	Now
Heart rate	110/min	104/min	100/min
Blood pressure	125/80mmHg	109/75mmHg	97/79mmHg
Respiratory rate	18/min	14/min	14/min
Temperature	37.2°C	37.3°C	37.3°C

She has been prescribed intravenous fluids and commenced on oxygen at a rate of 15L/min via a non-rebreathe mask.

What is the single most appropriate *initial* investigation(s) to assess for the presence of free fluid in the abdomen and chest?

- ☐ CT abdomen and CT chest
- ☐ MRI abdomen and MRI chest
- ☐ MRI abdomen and CT chest
- ☐ Diagnostic peritoneal lavage
- ☐ FAST scan

CT abdomen and CT chest	20%
MRI abdomen and MRI chest	2%
MRI abdomen and CT chest	2%
Diagnostic peritoneal lavage	3%
FAST scan	73%

FAST scans can be used to assess the presence of fluid in the abdomen and thorax

Important for me Less important

While CT imaging is useful in the assessment of free fluid in the abdomen and chest of trauma patients, the most appropriate *initial* investigation to conduct is a focused assessment with sonography for trauma (FAST) scan. In the hands of a skilled practitioner, this can detect free fluid surrounding the kidneys, the spleen, the liver, bladder and pericardium. It is also possible to visualise all four chambers of the heart and to assess the hepatic vasculature. An **extended focused assessment with sonography for trauma** (eFAST) can be conducted, which also assesses for pneumothorax. The sensitivity of a FAST detecting a pneumothorax is 40%, however is considered more sensitive than a supine chest radiograph at detecting pneumothoraces.

FAST scans have replaced diagnostic peritoneal lavages as the investigation of choice for suspected haemoperitoneum. MRI imaging is less commonly used in patients presenting with traumatic injuries.



Discuss

Improve

A 64-year-old patient is referred to dermatology outpatients due to a rash. A diagnosis necrolytic migratory erythema is made. What is the most likely underlying diagnosis?

- ☐ Gastrinoma
- ☐ Lung cancer
- ☐ Glucagonoma
- ☐ Pancreatic cancer
- ☐ Lymphoma

Gastrinoma

16%

Lung cancer

5%

Glucagonoma

53%

Pancreatic cancer

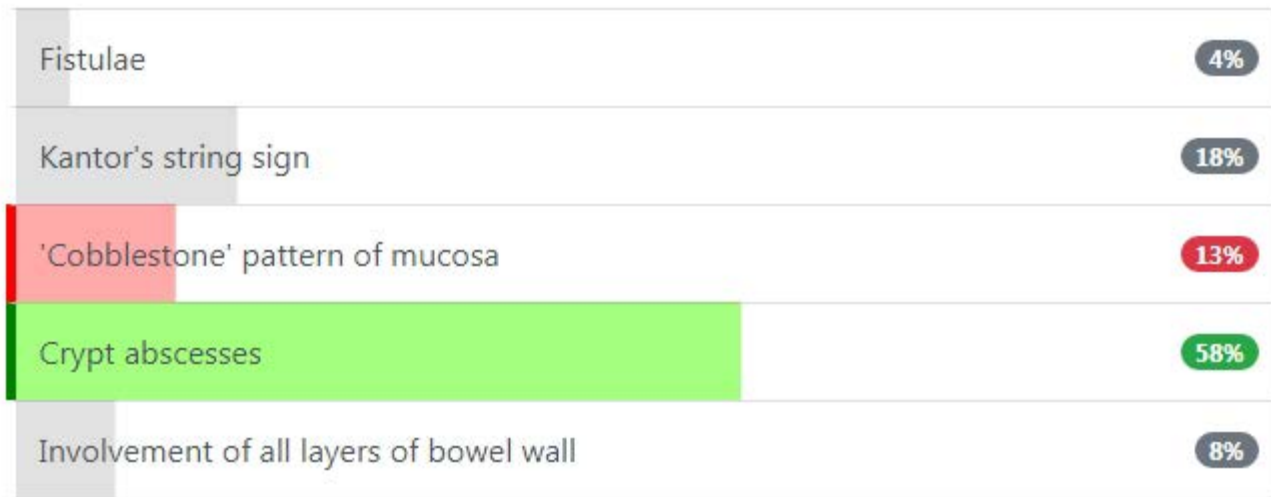
19%

Lymphoma

7%

Which one of the following is least associated with Crohn's disease?

- ☐ Fistulae
- ☐ Kantor's string sign
- ☐ 'Cobblestone' pattern of mucosa
- ☐ Crypt abscesses
- ☐ Involvement of all layers of bowel wall



Crypt abscesses are sometimes seen in Crohn's disease but they are more commonly associated with ulcerative colitis

A patient presents with gastrointestinal symptoms. Which one of the following features in the history would be least consistent with making a diagnosis of irritable bowel syndrome?

- ☐ Urgency to open bowels
- ☐ Symptoms made worse by eating
- ☐ 62-year-old female
- ☐ Passage of mucous with stool
- ☐ Bladder symptoms

Urgency to open bowels	6%
Symptoms made worse by eating	8%
62-year-old female	47%
Passage of mucous with stool	11%
Bladder symptoms	28%

Onset after 60 years of age is considered a red flag in the new NICE guidelines.

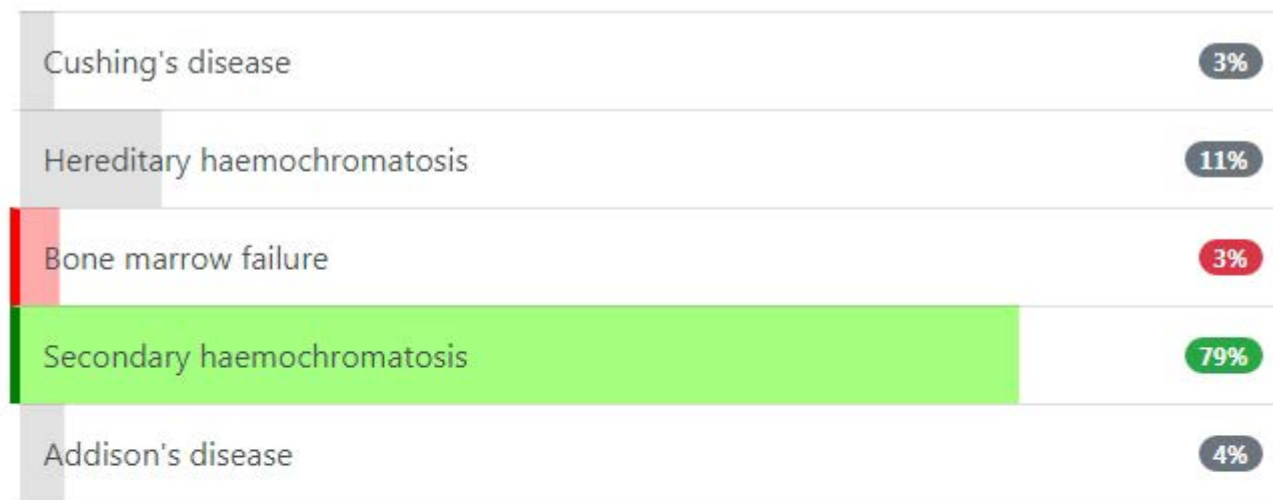
An 80-year-old female is referred to the endocrinology clinic by her GP with new onset diabetes. She has a background of hypertension, mild osteoarthritis of the knees and myelodysplasia. She has been dependent on twice-monthly blood transfusions for the past five years.

On examination she has a tan complexion which she attributes to being a keen gardener. There is no palpable organomegaly.

Hb	95 g/l
Platelets	222* $10^9/l$
WBC	5.7* $10^9/l$

What is the likely diagnosis?

- ☐ Cushing's disease
- ☐ Hereditary haemochromatosis
- ☐ Bone marrow failure
- ☐ Secondary haemochromatosis
- ☐ Addison's disease



Although hereditary (autosomal recessive) haemochromatosis is fairly common in Western Europe, this patient's age makes a genetic diagnosis less likely. Her fortnightly transfusions are contributing to an iatrogenic iron overload. Clues pointing to haemochromatosis are the new onset diabetes and classic 'bronzing' of the skin. Although osteoarthritis is extremely common among elderly population, joint disease can also be a manifestation of haemochromatosis.

A 44-year-old man is diagnosed with a duodenal ulcer. CLO testing performed during the gastroscopy is positive for *Helicobacter pylori*. What is the most appropriate management to eradicate *Helicobacter pylori*?

- ☐ Lansoprazole + clindamycin + metronidazole
- ☐ Lansoprazole + amoxicillin + clindamycin
- ☐ Lansoprazole + amoxicillin + clarithromycin
- ☐ Omeprazole + amoxicillin + clindamycin
- ☐ Omeprazole + penicillin + metronidazole

Lansoprazole + clindamycin + metronidazole

5%

Lansoprazole + amoxicillin + clindamycin

4%

Lansoprazole + amoxicillin + clarithromycin

71%

Omeprazole + amoxicillin + clindamycin

12%

Omeprazole + penicillin + metronidazole

8%

H. pylori eradication:

- PPI + amoxicillin + clarithromycin, or
- PPI + metronidazole + clarithromycin

Important for me Less important

The BNF recommends a regimen containing amoxicillin and clarithromycin as first-line therapy

A 67-year-old man with a history of oesophageal cancer is reviewed on the ward. He has been treated previously with an oesophagectomy and has recently had a course of chemotherapy. Unfortunately he has been feeling increasingly unwell recently and has not eaten anything for the 7 days due to dysphagia. An nasogastric tube is passed and it is decided to start enteral feeding. What is the most appropriate course of action to avoid refeeding syndrome?

- ☐ Provide 50% of normal energy and protein requirements for the first 2 days
- ☐ Start a saline infusion with 20 mmol of potassium for the first 8 hours
- ☐ Provide 75% of normal energy and protein requirements for the first 2 days
- ☐ Give furosemide 40mg IV at the mid-point of the first feed
- ☐ Give hydrocortisone 200mg IV at the mid-point of the first feed

Provide 50% of normal energy and protein requirements for the first 2 days

71%

Start a saline infusion with 20 mmol of potassium for the first 8 hours

12%

Provide 75% of normal energy and protein requirements for the first 2 days

10%

Give furosemide 40mg IV at the mid-point of the first feed

4%

Give hydrocortisone 200mg IV at the mid-point of the first feed

4%

Give 50% of normal energy intake in starved patients (> 5 days) to avoid refeeding syndrome

Important for me Less important

A 28-year-old woman who is 32 weeks pregnant presents with itch.

On examination her abdomen is non tender with the uterus an appropriate size for her gestation. There is no visible rash, although she is mildly jaundiced. Her heart rate is 74/min, blood pressure 129/62mmHg, respiratory rate 20/min, oxygen saturations are 98% in air, temperature 36.8°C.

A set of blood results reveal:

Hb	110 g/l	Na ⁺	139 mmol/l	Bilirubin	54 µmol/l
Platelets	243 10 ⁹ /l	K ⁺	4.1 mmol/l	ALP	353 u/l
WBC	8.2 10 ⁹ /l	Urea	4.6 mmol/l	ALT	84 u/l
Neuts	5.7 10 ⁹ /l	Creatinine	74 µmol/l	γGT	207 u/l
Lymphs	1.8 * 10 ⁹ /l			Albumin	34 g/l

What is the most likely cause of her symptoms?

☐ Intrahepatic cholestasis of pregnancy

☐ HELLP syndrome

☐ Pre-eclampsia

☐ Acute fatty liver of pregnancy

☐ Biliary colic

Intrahepatic cholestasis of pregnancy	81%
HELLP syndrome	3%
Pre-eclampsia	2%
Acute fatty liver of pregnancy	11%
Biliary colic	3%

The answer here is intrahepatic cholestasis of pregnancy.

This is a common cause of itch in the third trimester of pregnancy. It will give a cholestatic picture of liver function tests (LFTs) with a high ALP and GGT, with a lesser rise in ALT. Patients may also be jaundiced with right upper quadrant pain and steatorrhoea. Ursodeoxycholic acid is a common treatment.

The cholestatic LFTs could indicate biliary colic, however the absence of abdominal pain here makes it very unlikely.

Acute fatty liver of pregnancy also occurs in the third term of pregnancy but a hepatic picture would be expected on LFTs, with a rise in ALT/AST greater than that of ALP, a raised white cell count and potential clotting abnormalities. This condition is rare and patients are likely to be unwell with nausea, vomiting, jaundice and possible encephalopathy.

In HELLP syndrome you would see a haemolytic anaemia, the mild anaemia seen here does not correlate with this and also low platelets not seen here.

This lady is not hypertensive and does not have any other features of pre-eclampsia so this is unlikely. In late pre-eclampsia a hepatic derangement of LFTs might be seen.

A 47-year-old man with a history of alcohol liver disease is admitted to the gastroenterology ward. He has developed tense ascites again and a plan is made to site an ascitic drain. His renal function after 2 days is as follows:

Na ⁺	131 mmol/l
K ⁺	3.8 mmol/l
Urea	12.2 mmol/l
Creatinine	205 µmol/l

Which of the following pathophysiological changes is most likely to be responsible for the declining renal function?

- ☐ Splanchnic vasoconstriction
- ☐ Splanchnic vasodilation
- ☐ Ammonia-induced nephropathy
- ☐ Intrahepatic portosystemic shunting of blood
- ☐ Renal artery vasodilation

Splanchnic vasoconstriction

23%

Splanchnic vasodilation

50%

Ammonia-induced nephropathy

6%

Intrahepatic portosystemic shunting of blood

15%

Renal artery vasodilation

6%

Hepatorenal syndrome is primarily caused by splanchnic vasodilation

Important for me

Less important

A 73-year-old man comes to the gastroenterology clinic for review. He has moderate aortic stenosis but is currently not keen to progress to valve replacement. He presents with persistent iron deficiency anaemia for which no cause has been found in spite of one upper GI endoscopy and two colonoscopies. What is the next most appropriate step?

- ☐ CT abdomen
- ☐ Capsule endoscopy
- ☐ Intra-operative enteroscopy
- ☐ Labelled white cell scan
- ☐ Repeat upper GI endoscopy

CT abdomen	23%
Capsule endoscopy	62%
Intra-operative enteroscopy	3%
Labelled white cell scan	8%
Repeat upper GI endoscopy	4%

There is a suspicion here that the patient may have Heyde's syndrome, with aortic stenosis and angiodysplasia resulting in chronic gastrointestinal blood loss. The repeated negative upper and lower GI endoscopies suggest that small bowel angiodysplasia may be the cause, in an area which is difficult to image via conventional endoscopy. In this situation capsule endoscopy has a higher yield and would be the appropriate next step. The pathophysiology of angiodysplasia in this situation isn't known, although it may be due to changes in pressure within the mesenteric venous plexus, as the condition often resolves once the valve is treated.

CT abdomen doesn't have suitable resolution to identify areas of angiodysplasia, and a repeat upper GI endoscopy is unlikely to identify a cause of bleeding given the first investigation was negative. Labelled white cell scanning is most useful in cases of marked blood loss, and intra-operative enteroscopy is usually considered if repeat endoscopies and capsule testing are negative. Intra-operative enteroscopy also carries greater risk until the valve is repaired.

A 78-year-old woman presents with persistent diarrhoea. Her symptoms started around three months ago and she is now passing frequent 'mucous' like stools. There is no visible blood in the stool and her weight is stable. Bloods show the following:

Hb	11.6 g/dl
Platelets	$222 \times 10^9/l$
WBC	$7.8 \times 10^9/l$

Na ⁺	144 mmol/l
K ⁺	3.1 mmol/l
Urea	8.2 mmol/l
Creatinine	101 μ mol/l

What is the most likely diagnosis?

- ☐ Diverticular disease
- ☐ Angiodysplasia
- ☐ Tubular adenoma
- ☐ Colon cancer
- ☐ Villous adenoma

Diverticular disease

23%

Angiodysplasia

9%

Tubular adenoma

10%

Colon cancer

12%

Villous adenoma

45%

Diarrhoea + hypokalaemia → villous adenoma

Important for me Less important

Which one of the following investigations is considered the gold standard for the diagnosis of gastro-oesophageal reflux disease?

- ☐ Endoscopy
- ☐ 24hr oesophageal pH monitoring
- ☐ Oesophageal manometry
- ☐ Barium swallow
- ☐ CT thorax

Endoscopy

14%

24hr oesophageal pH monitoring

65%

Oesophageal manometry

16%

Barium swallow

3%

CT thorax

2%

24hr oesophageal pH monitoring is gold standard investigation in GORD

Important for me Less important

A 67-year-old man is investigated for dyspepsia. A gastroscopy reveals a suspicious lesion which is biopsied. Which one of the following findings on biopsy would be most consistent with a diagnosis of gastric adenocarcinoma?

- ☐ Columnar metaplasia
- ☐ Histiocytic infiltration
- ☐ Paneth cell metaplasia
- ☐ Giant cell granulomas
- ☐ Signet ring cells

Columnar metaplasia

27%

Histiocytic infiltration

8%

Paneth cell metaplasia

9%

Giant cell granulomas

5%

Signet ring cells

51%

Gastric adenocarcinoma - signet ring cells

Important for me Less important

A 30-year-old woman presents with abdominal pain that is associated with alternating diarrhoea and constipation. Which one of the following symptoms is least consistent with a diagnosis of irritable bowel syndrome?

- ☐ Feeling of incomplete stool evacuation
- ☐ Waking at night due to the pain
- ☐ Abdominal bloating
- ☐ Faecal urgency
- ☐ Passage of mucous with stool

Feeling of incomplete stool evacuation

8%

Waking at night due to the pain

68%

Abdominal bloating

4%

Faecal urgency

7%

Passage of mucous with stool

13%

Pain which wakes a patient at night is not a feature that would be expected in irritable bowel syndrome.

A 50-year-old man who is known to have obesity and hypertension comes for review. His current BMI is 38 kg/m^2 and blood pressure today is 154/92 mmHg despite ramipril and bendroflumethiazide. Lifestyle and a trial of orlistat have failed to reduce his weight. Which one of the following is the most suitable intervention?

- ☐ Biliopancreatic diversion with duodenal switch
- ☐ Laparoscopic-adjustable gastric banding
- ☐ Trial of sibutramine
- ☐ Referral for counselling to discuss his excessive eating
- ☐ Sleeve gastrectomy

Biliopancreatic diversion with duodenal switch

11%

Laparoscopic-adjustable gastric banding

51%

Trial of sibutramine

6%

Referral for counselling to discuss his excessive eating

7%

Sleeve gastrectomy

26%

A trial of sibutramine would not be appropriate given his poorly controlled hypertension. Laparoscopic-adjustable gastric banding is the intervention of choice in patients with a BMI < 40 kg/m².

A 58-year-old male was admitted for bowel obstruction 2 weeks ago, treated with bowel rest, and after several days commenced on intravenous total parental nutrition. Murphy's sign negative, and no abdominal pain is present. His current medications include pantoprazole 40mg daily, paracetamol 1g QID, morphine 3.5mg subcutaneous PRN & perindopril 5mg day.

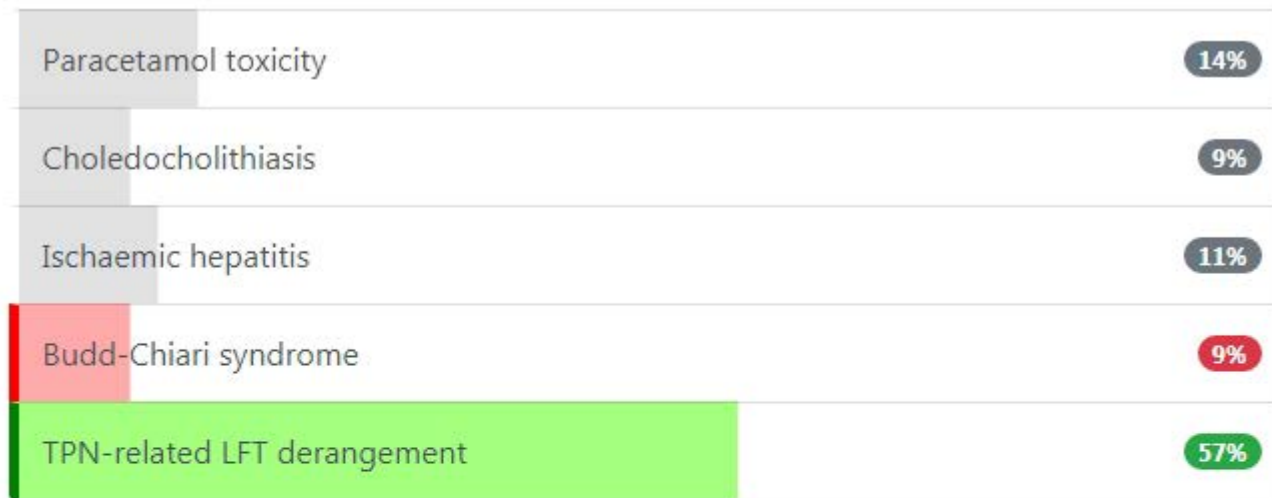
Hb	130 g/l
Platelets	140 * 10 ⁹ /l
WBC	6.7 * 10 ⁹ /l

Na ⁺	135 mmol/l
K ⁺	3.4 mmol/l
Urea	8.5 mmol/l
Creatinine	114 µmol/l

Bilirubin	45 µmol/l
ALP	150 u/l
ALT	328 u/l
AST	340 u/l
γGT	180 u/l
Albumin	30 g/l
INR	1.2

USS abdomen is unremarkable. What is the likely cause of his abnormal blood tests?

- ☐ Paracetamol toxicity
- ☐ Choledocholithiasis
- ☐ Ischaemic hepatitis
- ☐ Budd-Chiari syndrome
- ☐ TPN-related LFT derangement



The key here is the presence of TPN, rise of ALT/AST less than 1000 (unlikely ischaemic or paracetamol) and no abdominal pain (In Budd-Chiari you would expect some abdominal pain, and findings on ultrasound). For ischaemic hepatitis the stem would have given information about cardiac arrest. If it was paracetamol ingestion, the stem would have indicated as such. Both paracetamol and ischaemic hepatitis will often have transaminases in the thousands.

A 72-year-old female is admitted with diarrhoea to the acute medical unit. A sigmoidoscopy is performed which shows multiple white plaques adhered to the gastrointestinal mucosa. What is the most likely diagnosis?

- ☐ Crohn's disease
- ☐ Ulcerative colitis
- ☐ Ischaemic colitis
- ☐ Pseudomembranous colitis
- ☐ Colorectal cancer

Crohn's disease

6%

Ulcerative colitis

6%

Ischaemic colitis

8%

Pseudomembranous colitis

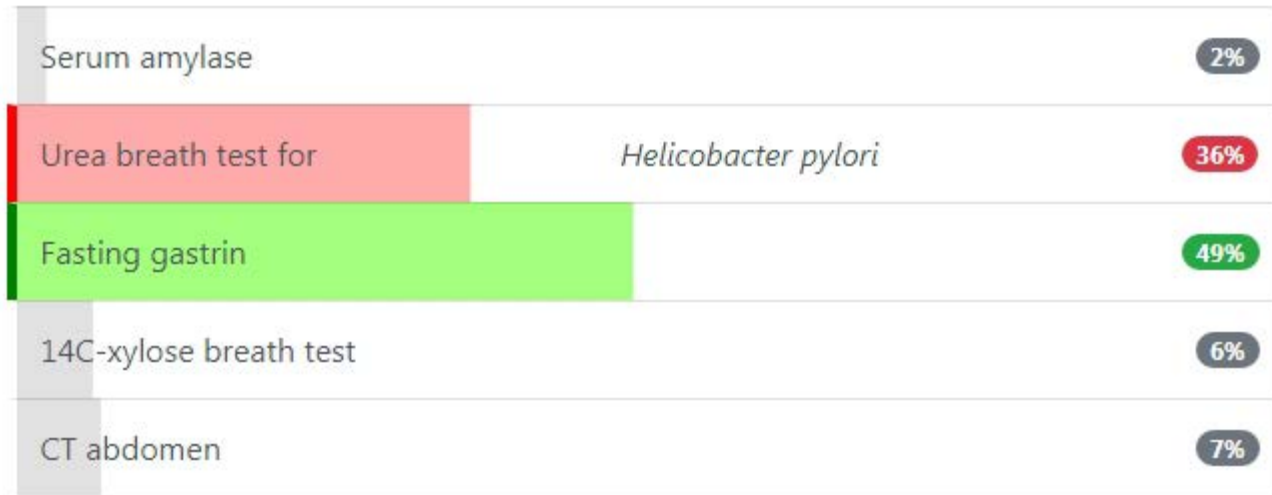
75%

Colorectal cancer

5%

A 43-year-old man is reviewed in the gastroenterology clinic. He has had troublesome dyspepsia for the past six months which has not settled with proton pump inhibitor therapy. During the review of systems he also reports passing 6-7 watery stools per day. An OGD 3 weeks ago showed gastric erosions and ulcers. Which one of the following investigations is most likely to be diagnostic?

- ☐ Serum amylase
- ☐ Urea breath test for *Helicobacter pylori*
- ☐ Fasting gastrin
- ☐ ¹⁴C-xylose breath test
- ☐ CT abdomen



CT abdomen has a sensitivity of only 50% for primary tumours in Zollinger-Ellison syndrome (ZES). Normal levels of fasting gastrin in untreated ZES are extremely rare

Which one of the following is most associated with oesophageal cancer?

- ☐ Coeliac disease
- ☐ Hypothyroidism
- ☐ Crohn's disease
- ☐ Addison's disease
- ☐ Ulcerative colitis

Coeliac disease

41%

Hypothyroidism

8%

Crohn's disease

35%

Addison's disease

7%

Ulcerative colitis

10%

What is the most common cause of hepatocellular carcinoma in the United Kingdom?

☐ Haemochromatosis

☐ Hepatitis B

☐ Alcohol excess

☐ Aflatoxin

☐ Hepatitis C

Haemochromatosis

3%

Hepatitis B

23%

Alcohol excess

23%

Aflatoxin

3%

Hepatitis C

49%

Hepatocellular carcinoma

- hepatitis B most common cause worldwide
- hepatitis C most common cause in Europe

Important for me Less important

A 35-year-old woman is admitted to the Emergency Department following a deliberate overdose of 50 paracetamol tablets around 10 hours ago. On admission she complains of abdominal pain and lethargy. Her prothrombin time is elevated and arterial blood gases show that she is developing a metabolic acidosis. An urgent transfer to the tertiary liver transplant unit is arranged. What is the main pathological process seen in the hepatocytes of such patients with fulminant hepatitis?

- ☐ Apoptosis
- ☐ Fibrosis
- ☐ Ischaemia
- ☐ Senescence
- ☐ Necrosis



In patients such as this one necrosis affects the entire acinus (panacinar necrosis) resulting in liver failure. This is in contrast to the apoptosis seen in patients with mild cases of viral hepatitis, resulting in the possibility of regeneration and recovery of hepatocellular function.

A 24-year-old man is brought to the emergency department by ambulance with profound haematemesis. He was discharged three months ago following a small episode of haematemesis where he was found to have a posterior gastric ulcer and was treated endoscopically initially along with *Helicobacter pylori* eradication therapy. He had a follow up gastroscopy four weeks later which showed some active oozing from the ulcer although it appeared to be healing. Further endoscopic treatment was performed at the time. He reports that since then he has had two episodes of dark stools but they resolved on their own.

On examination he has a pulse rate of 143 bpm, a blood pressure of 98/61 mmHg and a capillary refill time of 4 seconds centrally. He has no past medical history and he only takes lansoprazole 30 mg daily regularly.

Given the history, which of the following treatments is most appropriate to manage this man's bleeding ulcer?

- ☐ Laparotomy and surgical exploration
- ☐ Repeat endoscopic treatment
- ☐ Intravenous proton-pump inhibitor therapy
- ☐ Insertion of a Sengstaken-Blakemore tube
- ☐ Intravenous terlipressin

Dr Assem

Laparotomy and surgical exploration

36%

Repeat endoscopic treatment

22%

Intravenous proton-pump inhibitor therapy

12%

Insertion of a Sengstaken-Blakemore tube

13%

Intravenous terlipressin

17%

Surgery is indicated in patients with ongoing acute bleeding despite repeated endoscopic therapy

Important for me Less important

A repeat endoscopy given two previous treatments is unlikely to be effective and it would be more appropriate to proceed to surgical exploration and repair of the ulcer at laparotomy. The position of the ulcer suggests involvement of one of the large vessels supplying the foregut, either the right or left gastric arteries or the gastroduodenal artery, and therefore an urgent surgical procedure is more likely to be successful in arresting the bleeding.

While he will likely receive intravenous proton-pump inhibitors anyway, these alone are unlikely to be of any help given the severity of the bleeding.

Terlipressin and use of a Sengstaken-Blakemore tube are both treatments for oesophageal varices and would be of no benefit in treating this man's ulcer.

Dr Assem

A 52-year-old woman is diagnosed with non-alcoholic steatohepatitis following a liver biopsy. What is the single most important step to help prevent the progression of her disease?

- ☐ Stop smoking
- ☐ Start statin therapy
- ☐ Eat more omega-3 fatty acids
- ☐ Start sulfonylurea therapy
- ☐ Weight loss

Stop smoking

9%

Start statin therapy

8%

Eat more omega-3 fatty acids

5%

Start sulfonylurea therapy

2%

Weight loss

76%

Weight loss is the best first line management for NAFLD

Important for me Less important

A 30-year-old man enquires about screening for haemochromatosis as his brother was diagnosed with the condition 2 years ago. The patient is currently well with no features suggestive of haemochromatosis. What is the most appropriate investigation?

- ☐ Serum total iron-binding capacity
- ☐ HFE gene analysis
- ☐ Serum transferrin saturation
- ☐ Serum ferritin
- ☐ Serum iron

Serum total iron-binding capacity	3%
HFE gene analysis	60%
Serum transferrin saturation	25%
Serum ferritin	10%
Serum iron	2%

Screening for haemochromatosis

- general population: transferrin saturation > ferritin
- family members: HFE genetic testing

Important for me Less important

Serum transferrin saturation is currently the preferred investigation for population screening. However, the patient has a sibling with haemochromatosis and therefore HFE gene analysis is the most suitable investigation. In clinical practice this would be combined with iron studies as well

A 26-year-old man is investigated for diarrhoea and weight loss. A bowel biopsy shows findings consistent with Crohn's disease. Which one of the following factors is likely to be the most important aetiological factor?

- ☐ A diet with an increased ratio of omega-3 to omega-6 polyunsaturated fatty acids
- ☐ Smoking
- ☐ A diet low in vitamin B6
- ☐ High levels of sulfate-reducing bacteria in the gut
- ☐ Genetic predisposition

A diet with an increased ratio of omega-3 to omega-6 polyunsaturated fatty acids 2%

Smoking 53%

A diet low in vitamin B6 4%

High levels of sulfate-reducing bacteria in the gut 3%

Genetic predisposition 38%

Crohn's disease is known to have a strong genetic component - siblings are 30 times more likely to develop Crohn's than the general population.

Remember, smoking is bad for Crohn's in the sense it makes flares on more likely (in contrast to ulcerative colitis) but it is not thought to be a cause of Crohn's disease.

A 25-year-old man presents with bloody diarrhoea associated with systemic upset. Blood tests show the following:

Hb	13.4 g/dl
Platelets	$467 \times 10^9/l$
WBC	$8.2 \times 10^9/l$
CRP	89 mg/l

A diagnosis of ulcerative colitis is suspected. Which part of the bowel is most likely to be affected?

- ☐ Sigmoid colon
- ☐ Rectum
- ☐ Ascending colon
- ☐ Descending colon
- ☐ Terminal ileum

Sigmoid colon

16%

Rectum

61%

Ascending colon

5%

Descending colon

7%

Terminal ileum

10%

Ulcerative colitis - the rectum is the most common site affected

Important for me · Less important

A 76-year-old woman with a history of atrial fibrillation presents with abdominal pain and bloody diarrhoea. On examination her temperature is 37.8°C, pulse 102 / min and respiratory rate 30 / min. Her abdomen is tender with generalised guarding. Blood tests reveal the following:

Hb	10.9 g/dl
MCV	76 fl
Plt	348 * 10 ⁹ /l
WBC	23.4 * 10 ⁹ /l
Na ⁺	141 mmol/l
K ⁺	5.0 mmol/l
Bicarbonate	14 mmol/l
Urea	8.0 mmol/l
Creatinine	118 µmol/l

What is the most likely diagnosis?

- ☐ Diverticulitis
- ☐ Mesenteric ischaemia
- ☐ *Campylobacter* infection
- ☐ Ruptured abdominal aortic aneurysm
- ☐ Ulcerative colitis

Diverticulitis

10%

Mesenteric ischaemia

75%

Campylobacter

infection

7%

Ruptured abdominal aortic aneurysm

4%

Ulcerative colitis

4%

The low bicarbonate points to a metabolic acidosis - highly suggestive of mesenteric ischaemia.

A 43-year-old man presents to the emergency department with severe right upper quadrant abdominal pain. It developed to maximum intensity over the course of a day. On examination it is noted that he also has gross ascites and a 3cm liver edge is noted. He is not jaundiced. Bloods are as follows:

Hb	195 g/l
Platelets	$60 \times 10^9/l$
WBC	$9 \times 10^9/l$

What is the most likely underlying pathology?

- ☐ Schistosomiasis
- ☐ Hepatitis A
- ☐ Pancreatic cancer
- ☐ Essential thrombocythaemia (ET)
- ☐ Polycythaemia rubra vera (PRV)

Schistosomiasis	13%
Hepatitis A	10%
Pancreatic cancer	5%
Essential thrombocythaemia (ET)	11%
Polycythaemia rubra vera (PRV)	61%

Budd-Chiari syndrome is most likely due to a thrombophilia

Important for me Less important

This is a classical presentation of Budd-Chiari syndrome - a triad of abdominal pain, hepatomegaly and ascites. It is occlusion of the hepatic veins that drain the liver that causes a painful distension of the liver capsule and backflow portal hypertension - which will lead to the ascites.

Schistosomiasis can cause hepatic fibrosis and portal hypertension. However, there is no history to suggest this (it is endemic in sub-Saharan Africa). Hepatitis A can cause acute liver failure, but jaundice would be expected and ascites would be unusual.

Pancreatic cancer can very rarely cause a secondary Budd-Chiari syndrome by compression of the hepatic veins.

However, primary Budd-Chiari is the most common cause - and thrombophilias are the most common trigger. In this case ET is excluded by the low platelets (which is also a hallmark of the portal hypertension) and the high Hb is suggestive of PRV. JAK2 testing in this case would be diagnostic.

Other important causes are Antiphospholipid syndrome, pregnancy and Paroxysmal nocturnal haemoglobinuria.

Which one of the following is most strongly associated with coeliac disease?

☐ HLA A5

☐ HLA-DQ2

☐ HLA-DR2

☐ HLA-DR4

☐ HLA-B27

HLA A5

7%

HLA-DQ2

47%

HLA-DR2

15%

HLA-DR4

18%

HLA-B27

13%

A 66-year-old comes for review. He had a prosthetic aortic valve replacement five years ago for which he is warfarinised. Over the past three months he has been complaining of fatigue and a full blood count was requested:

Hb	10.3 g/dl
MCV	68 fl
Plt	$356 \times 10^9/l$
WBC	$5.2 \times 10^9/l$
Blood film	Hypochromia
INR	3.0

An upper GI endoscopy was reported as normal. What is the most appropriate next investigation?

- ☐ Transthoracic echocardiogram
- ☐ Colonoscopy
- ☐ Three sets of blood cultures
- ☐ Transoesophageal echocardiogram
- ☐ Reticulocyte count

Transthoracic echocardiogram

6%

Colonoscopy

67%

Three sets of blood cultures

4%

Transoesophageal echocardiogram

8%

Reticulocyte count

15%

Any patient of this age with an unexplained microcytic anaemia should have a lower gastrointestinal tract investigation to exclude colorectal cancer

A 32-year-old woman presents with a 2-month history of secondary amenorrhoea. This is associated with anorexia, nausea and fatigue. She has a past medical history of pernicious anaemia and type 1 diabetes mellitus.

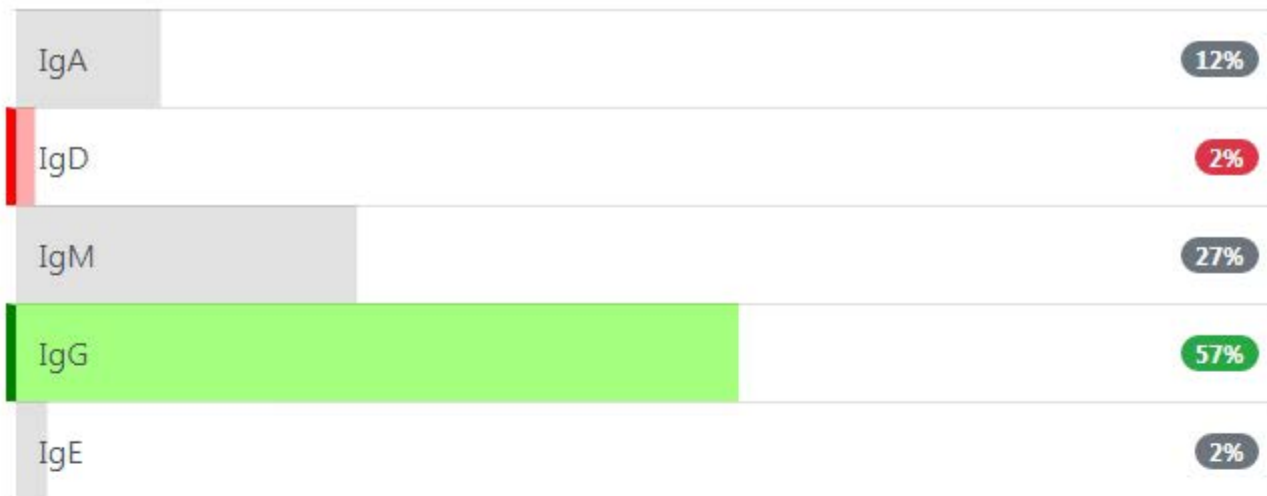
On examination: no peripheral stigmata of liver disease, JVP 2cm, mild scleral icterus, tenderness in the right hypochondrium with no rigidity or guarding and a 2cm liver edge.

Bloods:

Hb	12.2 g/dl
WCC	19.2 g/dl
Platelets	344 g/dl
Na+	139 mmol/l
K+	4.3 mmol/l
Urea	4.7 mmol/l
Creatinine	78 μ mol/l
CRP	48 mg/l
Bilirubin	78 μ mol/l
ALT	368 iu/l
ALP	190 iu/l
Albumin	34 u/l
Anti-LKM Antibodies	positive

Which immunoglobulin type would you expect the patient to have high titres of?

☐ IgA
☐ IgD
☐ IgM
☐ IgG
☐ IgE



Autoimmune hepatitis is commonly associated with young to middle aged females. The condition is linked with other autoimmune conditions including: coeliac disease, pernicious anaemia, thyroiditis and type 1 diabetes mellitus.

The pathophysiology of the disease is a T-cell mediated progressive necro-inflammatory process resulting in fibrosis and cirrhosis. The disease is characterised by an IgG hypergammaglobulinaemia.

Disease	Associated raised immunoglobulin subtype
Alcoholic liver disease	IgA
Primary biliary cirrhosis	IgM
Autoimmune hepatitis	IgG

A 40-year-old female patient comes to see you in clinic with a recent diagnosis of hereditary non-polyposis colorectal cancer (HNPCC). Other than colorectal cancer, of which of these malignancies is she most at risk?

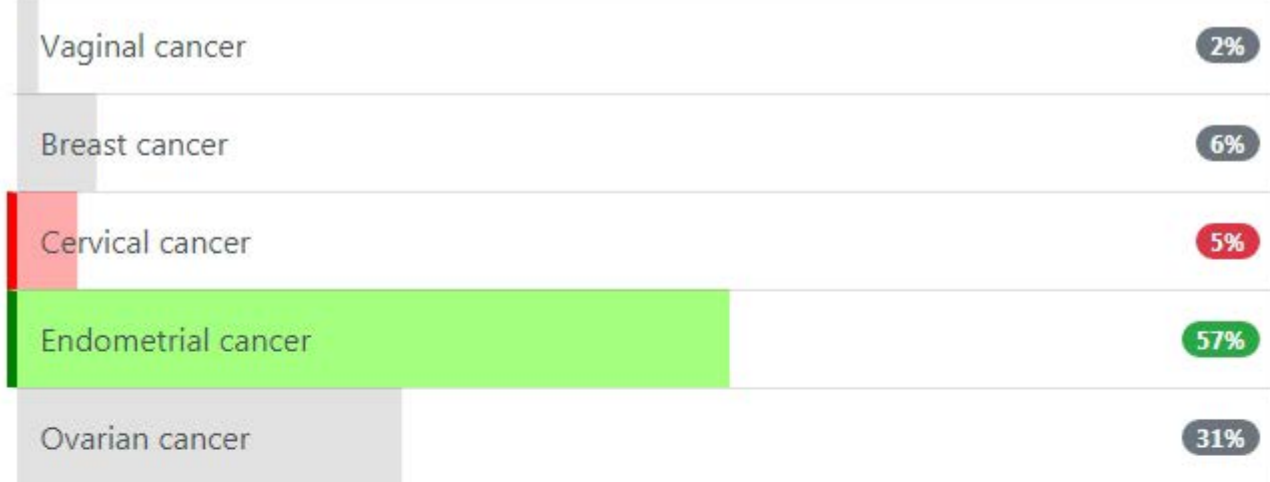
☐ Vaginal cancer

☐ Breast cancer

☐ Cervical cancer

☐ Endometrial cancer

☐ Ovarian cancer



In female patients, endometrial cancer is the most common extra-colonic manifestation of HNPCC. The exact risk depends on HNPCC genotype (60% lifetime risk in MLH1, 20% in MSH2). In fact, some studies show that women with the MLH1 genotype are more at risk of endometrial cancer than colorectal cancer.

Rates of ovarian cancer are also increased in HNPCC but not to the same extent (1-20% depending on genotype).

There is no confirmed link between breast cancer and HNPCC, however this has been suggested. There is no link between HNPCC and vaginal or cervical cancer.

There is no consensus about the value of endometrial screening for women for HNPCC, and current guidelines suggest that this takes place only within the context of a clinical trial.

Which of the following drugs is least likely to cause cholestasis?

☐ Anabolic steroids

☐ Erythromycin

☐ Prochlorperazine

☐ Halothane

☐ Flucloxacillin

Anabolic steroids

9%

Erythromycin

15%

Prochlorperazine

16%

Halothane

45%

Flucloxacillin

15%

A 67-year-old man presents with shortness-of-breath. He has a past history of aortic stenosis but is otherwise well. On examination he has a systolic murmur and a clear chest. Routine bloods are as follows:

Hb	8.7 g/dl
MCV	71 fl
Plt	$277 \times 10^9/l$
WBC	$6.4 \times 10^9/l$

Which one of the following investigations is most likely to explain his anaemia?

- ☐ Colonoscopy
- ☐ Renal biopsy
- ☐ Duodenal biopsy
- ☐ Gastroscopy
- ☐ Echocardiogram



This patient most likely has angiodysplasia which has a known association with aortic stenosis.

Dr Assem

You are reviewing a 59-year-old male in the gastroenterology out-patient clinic following a recent surveillance ultrasound scan for hepatocellular carcinoma (HCC). This demonstrated three new liver lesions which were not present on his scan from six months previously. A triple phase CT performed following his ultrasound scan confirmed three lesions measuring 6cm, 4.5 cm and 1.9 cm that all show arterial enhancement with venous washout. Evidence of vascular and lymphatic invasion is also identified.

His medical history is notable for Child-Pugh C cirrhosis secondary to a combination of haemochromatosis and previous heavy alcohol use. This has been complicated by one episode of variceal bleeding 18 months previously and recurrent episodes of encephalopathy. The latter has been successfully managed medically since the introduction of rifaximin at his last clinic review.

With respect to the likely diagnosis of HCC, what is the most appropriate management?

- ☐ Best supportive care
- ☐ Sorafenib
- ☐ Radio Frequency Ablation (RFA)
- ☐ Resection of the affected lobe
- ☐ Transarterial chemoembolization (TACE)

Dr Assem

Best supportive care	38%
Sorafenib	13%
Radio Frequency Ablation (RFA)	10%
Resection of the affected lobe	13%
Transarterial chemoembolization (TACE)	26%

Hepatocellular carcinoma (HCC) should be managed according to the Barcelona Classification for Liver Cancer Treatment System.

Patients with Child-Pugh A cirrhosis without signs of portal hypertension who have single lesions <2cm in size should be treated with surgical resection.

For those patients with Child-Pugh A and B cirrhosis and 2-3 tumours ≤ 3 cm or 1 tumour ≤ 5 cm without vascular invasion or extrahepatic spread should be considered for liver transplantation. As a bridge to liver transplantation these patients can be treated with TACE or RFA.

For those patients who have Child-Pugh A or B cirrhosis, good performance status, and evidence of vascular, lymphatic or extrahepatic spread the multiple tyrosine kinase inhibitor, Sorafenib, has been shown to prolong survival.

Those with Child-Pugh C cirrhosis have end-stage liver disease and are poor candidates for therapy as they lack any hepatic functional reserve to tolerate either resection, TACE or RFA. These patients are best treated symptomatically. Early involvement of community and/ or hospital palliative care teams should be considered. Best supportive care is therefore the correct option here.

Which one of the following drugs used in the management of diabetes mellitus is most likely to cause cholestasis?

- ☐ Metformin
- ☐ Gliclazide
- ☐ Acarbose
- ☐ Pioglitazone
- ☐ Insulin

Metformin

12%

Gliclazide

49%

Acarbose

16%

Pioglitazone

20%

Insulin

3%

Sulphonylureas may cause cholestasis

Important for me

Less important

A 47-year-old female patient attends her GP with a one week history of nausea, upper abdominal discomfort and acid reflux. Four weeks earlier she had completed a *Helicobacter pylori* (*H. pylori*) eradication therapy, consisting of omeprazole, amoxicillin and clarithromycin. What is the most appropriate next step in the management of this patient?

- ☐ Re-test for *H. pylori* using a carbon-13 urea breath test
- ☐ Refer the patient for an upper GI endoscopy
- ☐ Re-test for *H. pylori* using a stool antigen test
- ☐ Commence second-line treatment for *H. pylori* with omeprazole, amoxicillin and doxycycline
- ☐ Commence second-line treatment for *H. pylori* with omeprazole, amoxicillin and metronidazole

Re-test for	<i>H. pylori</i>	using a carbon-13 urea breath test	57%
Refer the patient for an upper GI endoscopy			23%
Re-test for	<i>H. pylori</i>	using a stool antigen test	6%
Commence second-line treatment for	<i>H. pylori</i>	with omeprazole, amoxicillin and doxycycline	3%
Commence second-line treatment for	<i>H. pylori</i>	with omeprazole, amoxicillin and metronidazole	11%

The presentation of this patient suggests an inadequate response with her initial *H. pylori* eradication regime. Expert opinion recommends re-testing for *H. pylori* before second-line treatment is considered to confirm eradication as there are serious side effects associated with antibiotics, e.g. *Clostridium difficile* infection, and antibiotic resistance is increasing.

According to the British Infection Association¹, the carbon-13 urea breath test is the most accurate method of re-testing for *H. pylori*. This should be performed 4 weeks after the eradication therapy since antibiotics and proton pump inhibitors (PPIs) can suppress the bacteria causing a false negative result.

A PPI, amoxicillin and clarithromycin or a PPI, amoxicillin and metronidazole is typically used first-line in *H. pylori* eradication. Second-line treatment will use a PPI, amoxicillin and either clarithromycin or metronidazole whichever was not used for first-line treatment.

In patients who have an inadequate response to second-line treatment, patients should be referred for upper GI endoscopy.

1.

<https://www.gov.uk/government/uploads/system/uploads/attachmentdata/file/346305/Hel>

A 34-year-old female with a history of alcoholic liver disease is admitted with frank haematemesis. She was discharged three months ago following treatment for bleeding oesophageal varices. Following resuscitation, what is the most appropriate treatment whilst awaiting endoscopy?

- ☐ Octreotide
- ☐ Omeprazole
- ☐ Propranolol
- ☐ Tranexamic acid
- ☐ Terlipressin

Octreotide

10%

Omeprazole

5%

Propranolol

14%

Tranexamic acid

3%

Terlipressin

68%

Terlipressin is the only licensed vasoactive agent for variceal haemorrhage in the UK

The most common type of inherited colorectal cancer:

- ☐ Familial adenomatous polyposis
- ☐ Li-Fraumeni syndrome
- ☐ Hereditary non-polyposis colorectal carcinoma
- ☐ Fanconi syndrome
- ☐ Peutz-Jeghers syndrome

Familial adenomatous polyposis

24%

Li-Fraumeni syndrome

2%

Hereditary non-polyposis colorectal carcinoma

68%

Fanconi syndrome

2%

Peutz-Jeghers syndrome

4%

A 57-year-old gentleman presents to the emergency department complaining of nausea, vomiting and abdominal pain. His urine and serum test results show elevated ketone levels and his serum glucose level is 3mmol/L. An ABG is performed and shows the following results:

pH	7.24
PaO ₂	14.7 kPa
PaCO ₂	3.5 kPa
HCO ₃	13 mEq/L

Which one of the following is most likely to be responsible for these findings?

- ☐ Hyperosmolar hyperglycemic state
- ☐ Diabetic ketoacidosis
- ☐ Alcoholic ketoacidosis
- ☐ Diabetic hypoglycemic episode
- ☐ Gastroenteritis

Hyperosmolar hyperglycemic state	4%
Diabetic ketoacidosis	14%
Alcoholic ketoacidosis	63%
Diabetic hypoglycemic episode	8%
Gastroenteritis	12%

Metabolic ketoacidosis with normal or low glucose: think alcohol

Important for me [Less important](#)

This gentleman is suffering a metabolic ketoacidosis with partial respiratory compensation. Diabetic or alcoholic ketoacidosis could cause this, however, a serum glucose of 3mmol/L makes diabetic ketoacidosis unlikely to be the cause. Hence this patient is likely to be suffering from alcoholic ketoacidosis.

A hyperosmolar hyperglycemic state would present with raised serum glucose and normal ketone levels.

A diabetic hypoglycemic episode would not usually present with a raised ketone level or metabolic acidosis.

Gastroenteritis may present with electrolyte disturbances and in some cases a metabolic acidosis, however, serum ketone levels would not usually be elevated.

A 35-year-old woman is referred to hospital. As part of a liver screen the following results are obtained:

Anti-HBs	Negative
Anti-HBc	Positive
HBs antigen	Positive
IgM anti-HBc	Negative

Anti-HBs = Hepatitis B Surface Antibody; Anti-HBc = Hepatitis B Core Antibody; HBs antigen = Hepatitis B Surface Antigen

What is the patient's hepatitis B status?

- ☐ Probable hepatitis D infection
- ☐ Acute hepatitis B infection
- ☐ Previous immunisation to hepatitis B
- ☐ Chronic hepatitis B
- ☐ Previous hepatitis B infection, not a carrier

Probable hepatitis D infection

3%

Acute hepatitis B infection

27%

Previous immunisation to hepatitis B

9%

Chronic hepatitis B

50%

Previous hepatitis B infection, not a carrier

11%

The negative IgM anti-HBc points to a chronic rather than acute infection.

A 45-year-old man presents to his GP. He has had a series of blood tests as part of a private medical screening test that have demonstrated abnormal liver functions tests. He is fit and well, asymptomatic and drinks around 40 units of alcohol per week.

Bilirubin	21 $\mu\text{mol/l}$
ALP	100 u/l
ALT	67 u/l
γGT	110 u/l
Albumin	40 g/l

Other bloods, including FBC, U&Es and fasting glucose were normal. You arrange a liver screen, results of which include:

Hepatitis B	Negative
Hepatitis C	Negative
Serum ferritin	550 microg/L (25-300 microg/L)
Immunoglobulins	Normal
Ultrasound liver	Fatty changes
Transferrin saturation	41% (<50%)

What is the most underlying likely cause of the elevated ferritin?

- ☐ Primary polycythaemia
- ☐ Hereditary haemochromatosis
- ☐ Excessive exercise
- ☐ Alcohol excess
- ☒ Carbon monoxide poisoning

Primary polycythaemia

7%

Hereditary haemochromatosis

29%

Excessive exercise

6%

Alcohol excess

54%

Carbon monoxide poisoning

4%

The normal transferrin saturation effectively excludes iron overload as a cause of the raised ferritin. It is therefore likely that this is caused by his alcohol excess.

Which of the following conditions is least associated with *Helicobacter pylori*?

- ☐ Gastric carcinoma
- ☐ B cell lymphoma of MALT tissue
- ☐ Gastro-oesophageal reflux disease
- ☐ Atrophic gastritis
- ☐ Peptic ulcer disease

Gastric carcinoma

14%

B cell lymphoma of MALT tissue

11%

Gastro-oesophageal reflux disease

52%

Atrophic gastritis

19%

Peptic ulcer disease

4%

Which one of the following conditions is most associated with angiodysplasia?

- ☐ Aortic regurgitation
- ☐ Ventricular septal defect
- ☐ Aortic stenosis
- ☐ Hypertrophic obstructive cardiomyopathy
- ☐ Mitral regurgitation

Aortic regurgitation

15%

Ventricular septal defect

6%

Aortic stenosis

64%

Hypertrophic obstructive cardiomyopathy

8%

Mitral regurgitation

8%

Angiodysplasia is associated with aortic stenosis

Important for me [Less important](#)

The association between angiodysplasia and aortic stenosis is thought to be caused by von Willebrand factor (vWF) being proteolysed in the turbulent blood flow around the aortic valve.

vWF is most active in vascular beds with high shear stress, such as angiodysplasia, and deficiency of vWF increases the bleeding risk from such lesions.

Dr. P. Sem

You are asked to review a 24-year-old man who has been admitted with an exacerbation of Crohn's disease. Despite prednisolone and mesalazine therapy for the past 3 weeks he is still passing 6-7 watery stools per day. He has lost a considerable amount of weight during this period. On examination he is afebrile, haemodynamically stable and his abdomen is soft and non-tender. What is the most appropriate next step?

☐ Metronidazole

☐ Infliximab

☐ Methotrexate

☐ Azathioprine

☐ Surgery

Metronidazole

6%

Infliximab

24%

Methotrexate

12%

Azathioprine

55%

Surgery

3%

A 45-year-old man with a history of alcohol excess is diagnosed as having grade 3 oesophageal varices during an outpatient endoscopy. Of the following options, what is the most appropriate management to prevent variceal bleeding?

- ☐ Propranolol
- ☐ Isosorbide mononitrate
- ☐ Endoscopic sclerotherapy
- ☐ Terlipressin
- ☐ Lansoprazole

Propranolol

69%

Isosorbide mononitrate

2%

Endoscopic sclerotherapy

13%

Terlipressin

12%

Lansoprazole

3%

A non-cardioselective B-blocker (NSBB) is used for the prophylaxis of oesophageal bleeding

Important for me Less important

Endoscopic sclerotherapy now has little role in the prophylaxis of variceal haemorrhage.

A 56-year-old man presents with a 48 hour history of nausea, vomiting and abdominal tenderness. His partner accompanies him and reports an increase in confusion. His past medical history includes alcohol dependence and depression. On examination you notice a liver flap and abdominal distention, which tests positive for shifting dullness. He has an AMTS score of 6/10. Observations are as follows: heart rate 92/min, blood pressure 142/85mmHg, respiratory rate 14/min, SpO₂ 96%, temperature 37.8°C.

Paracentesis is performed, which reveals an ascitic neutrophil count of $314 \times 10^6/L$.

What is the most likely organism that will be found on ascitic fluid culture in this patient?

☐ *Staphylococcus aureus*

☐ *E. coli*

☐ *Streptococcus pyogenes*

☐ *Candida species*

☐ *Staphylococcus epidermis*

Staphylococcus aureus

24%

E. coli

49%

Streptococcus pyogenes

13%

Candida species

3%

Staphylococcus epidermis

11%

Spontaneous bacterial peritonitis: most common organism found on ascitic fluid culture is *E. coli*

Important for me Less important

The patient in this question has spontaneous bacterial peritonitis (SBP). SBP presents with non-specific symptoms including nausea and vomiting, abdominal tenderness, fever and general malaise. Patients may also develop hepatic encephalopathy. The most common organism causing SBP is *E. coli*.

Which of the following drugs is least likely to cause cholestasis?

- ☐ Gliclazide
- ☐ Amiodarone
- ☐ Chlorpromazine
- ☐ Oral contraceptive pill
- ☐ Co-amoxiclav

Gliclazide

17%

Amiodarone

44%

Chlorpromazine

14%

Oral contraceptive pill

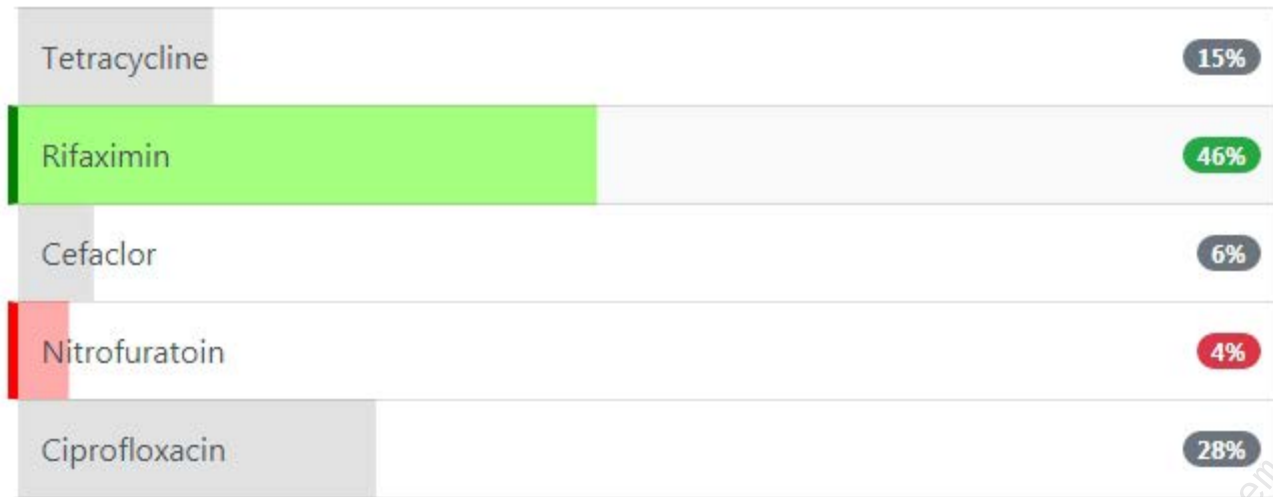
10%

Co-amoxiclav

15%

A 64-year-old woman complains of having 'excessive wind'. She is normally fit and well but for the past three months she has felt bloated and has been passing wind frequently. She also complains of vague upper abdominal pain and chronic diarrhoea. A hydrogen breath test confirms a diagnosis of small bowel bacterial overgrowth syndrome. What is the treatment of choice?

- ☐ Tetracycline
- ☐ Rifaximin
- ☐ Cefaclor
- ☐ Nitrofurantoin
- ☐ Ciprofloxacin



Tetracyclines are no longer commonly used due to widespread bacterial resistance.

A 49-year-old female is referred to the gastroenterology out-patient clinic with a 3 month history of epigastric pain and diarrhoea. Her GP initially prescribed lansoprazole 30mg od but this didn't alleviate her symptoms. The only past medical history of note is hyperparathyroidism.

Endoscopy revealed multiple duodenal ulcerations. What is the likely diagnosis?

- ☐ Multiple endocrine neoplasia type II a
- ☐ Coeliac disease
- ☐ Multiple endocrine neoplasia type I
- ☐ Autoimmune polyendocrinopathy syndrome
- ☐ Crohn's disease

Multiple endocrine neoplasia type II a	21%
Coeliac disease	5%
Multiple endocrine neoplasia type I	55%
Autoimmune polyendocrinopathy syndrome	10%
Crohn's disease	10%

Zollinger-Ellison syndrome: epigastric pain and diarrhoea

Important for me Less important

Zollinger-Ellison syndrome typically presents with multiple gastroduodenal ulcers causing abdominal pain and diarrhoea. High-dose proton pump inhibitors are needed to control the symptoms. Around a third of patients may have multiple endocrine neoplasia type I (MEN-I), explaining the hyperparathyroidism in this patient.

MEN-I

- parathyroid (95%): hyperparathyroidism due to parathyroid hyperplasia
- pituitary (70%)
- pancreas (50%, e.g. Insulinoma, gastrinoma)
- also: adrenal and thyroid

A 43-year-old man with type 2 diabetes mellitus presents with lethargy. His current medications include metformin and gliclazide, although the gliclazide may soon be stopped due to his obesity. A number of blood tests are ordered which reveal the following:

HbA1c	66 mmol/mol
Ferritin	204 ng/ml

Bilirubin	23 μ mol/l
ALP	162 u/l
ALT	120 u/l
AST	109 u/l

On discussing these results he states that he does not drink alcohol. What is the most likely cause of these abnormal results?

- ☐ Metformin-induced steatohepatitis
- ☐ Haemochromatosis
- ☐ Acute hepatitis secondary to gliclazide
- ☐ Cryptogenic cirrhosis
- ☐ Non-alcoholic fatty liver disease

Metformin-induced steatohepatitis

9%

Haemochromatosis

13%

Acute hepatitis secondary to gliclazide

17%

Cryptogenic cirrhosis

2%

Non-alcoholic fatty liver disease

59%

Obese T2DM with abnormal LFTs - ? non-alcoholic fatty liver disease

Important for me Less important

By far the most likely diagnosis in an obese type 2 diabetic is non-alcoholic fatty liver disease. This patient will require a liver screen, ultrasound and liver biopsy to confirm the diagnosis.

A normal ferritin makes a diagnosis of haemochromatosis unlikely, although it should always be considered in patients with both abnormal LFTs and diabetes.

Dr Assem

A 59-year-old male with a history of type 2 diabetes mellitus treated with metformin 1gram bd and modified release gliclazide 60mg od, and hypertension treated with olmesartan 40mg od and amlodipine 5mg od, presents with a 2-year history of watery, non-bloody diarrhoea and pre-defecatory abdominal pain. He denies recent travels, sick contacts, dietary changes, other medications or additional systemic symptoms. He had been on his current medications for 5 years and the only recent change is a reduction in his gliclazide dose from 120mg as his diabetic control improved following unintentional weight loss of 15kg. An abdominal/pelvis CT performed in the emergency department revealed an oedematous proximal small bowel but nil else of note. On examination he has profound muscle wasting. Results of his investigations are shown in the table below:

Hb	106 g/l	Na ⁺	138 mmol/l	Bilirubin	22 µmol/l	Immunoglobulins	Normal
Platelets	189 * 10 ⁹ /l	K ⁺	3.8 mmol/l	ALP	220 u/l	HLA DQ2/DQ8	Negative
WBC	9.0 * 10 ⁹ /l	Urea	7.7 mmol/l	ALT	33 u/l	C. diff toxins A/B	Negative
Neuts	7.0 * 10 ⁹ /l	Creatinine	87 µmol/l	γGT	55 u/l	Stool culture	Negative
Lymphs	1.5 * 10 ⁹ /l	CRP	2.3 mg/l	Albumin	23 g/l	Anti-TTG AB	Negative
Eosin	0.1 * 10 ⁹ /l	TSH	1.0 mIU/L	Vitamin D	20 ng/ml	Anti-endomysial AB	Negative

He proceeds to upper GI endoscopy and biopsies on an unrestricted gluten containing diet reveal sub-total villous atrophy. What is the most likely diagnosis?

- ☐ Crohn's disease
- ☐ Collagenous sprue
- ☐ Whipple's disease
- ☐ Drug (olmesartan) induced enteropathy
- ☐ Small bowel lymphoma

Crohn's disease	6%
Collagenous sprue	15%
Whipple's disease	33%
Drug (olmesartan) induced enteropathy	30%
Small bowel lymphoma	16%

Although coeliac disease is the most common cause of villous atrophy, patients with villous atrophy and negative coeliac serologies are encountered, posing a diagnostic and therapeutic dilemma. Possible aetiologies associated with villous atrophy and negative coeliac serologies include common variable immunodeficiency, autoimmune enteropathy, small intestinal bacterial overgrowth, infection, intestinal lymphoma, collagenous sprue, crohn's disease, and tropical sprue. When coeliac serologies are negative on a gluten-containing diet, alternative aetiologies for villous atrophy should be considered before a diagnosis of seronegative coeliac disease, to prevent an unnecessary lifelong gluten free diet. This is particularly true when the patient is negative for HLA DQ2/DQ8. HLA DQ2/DQ8 is strongly associated with coeliac disease and a negative HLA-DQ2/DQ8 genotype has a strong negative predictive value (<1% likelihood of coeliac disease being present; although please note that the converse of this is not true, as HLADQ2/DQ8 has a high prevalence in the general population). In this scenario, although seronegative coeliac disease is a potentially valid answer, the patient is on olmesartan, an angiotensin II receptor blocker, which has a well established association with severe sprue-like enteropathy with duodenal villous atrophy. Importantly, the enteropathy associated with olmesartan can develop months to years after the medication is started. As such, the olmesartan should be discontinued and the patient followed up to see if there is resolution of his symptoms. Other medications which have been associated with villous atrophy include mycophenolate mofetil and azathioprine.

A 19-year-old man is referred to the general medical clinic. For the past six months his family have noted increasing behavioural and speech problems. He himself has noticed that he is more clumsy than normal and reports excessive salivation. His older brother died of liver disease. Given the likely underlying condition what is the most appropriate therapy?

- ☐ Vitamin B6 supplements
- ☐ Venesection
- ☐ Ribavirin + interferon alpha
- ☐ Pulsed methylprednisolone
- ☐ Penicillamine

Vitamin B6 supplements

7%

Venesection

12%

Ribavirin + interferon alpha

6%

Pulsed methylprednisolone

6%

Penicillamine

70%

Treatment for Wilson's disease is currently penicillamine

Important for me

Less important

This man is likely to have Wilson's disease.

Dr Assem

A 23-year-old man is investigated for chronic diarrhoea associated with raised inflammatory markers. A bowel biopsy is taken. Which one of the following findings is most suggestive of ulcerative colitis?

- ☐ Multiple granulomas
- ☐ Goblet cell depletion
- ☐ Inflammation affecting the serosa
- ☐ Cobblestone appearance
- ☐ Skip lesions

Multiple granulomas

9%

Goblet cell depletion

46%

Inflammation affecting the serosa

20%

Cobblestone appearance

16%

Skip lesions

10%

Ulcerative colitis - depletion of goblet cells

Important for me Less important

A 34-year-old woman with a history of alcohol excess is admitted with abdominal swelling to the Acute Medical Unit. A diagnosis of ascites secondary to liver cirrhosis is made and paracentesis is performed. The serum creatinine on admission is $95\text{ }\mu\text{mol/l}$. Ten days after admission urine output decreases significantly and blood tests reveal:

Na^+	129 mmol/l
K^+	3.7 mmol/l
Urea	14.2 mmol/l
Creatinine	221 $\mu\text{mol/l}$

Albumin is given to correct suspected hypovolaemia. What is the most appropriate further management?

- ☐ Octreotide
- ☐ Propranolol
- ☐ Terlipressin
- ☐ Acetylcysteine
- ☐ Dopamine

Octreotide

16%

Propranolol

15%

Terlipressin

55%

Acetylcysteine

6%

Dopamine

8%

This patient has developed hepatorenal syndrome

Dr Assem

A 23-year-old who is 10 weeks pregnant is reviewed by the midwife at the booking visit. This is her first pregnancy and she is well apart from some sickness which is worse in the morning and a generalised pruritus. Bloods tests including the full blood count, hepatitis B, C and HIV serology are normal. A slight yellow tinge of her sclera is noticed and liver function tests are ordered:

Bilirubin	42 μ mol/L
ALP	90 U/L
ALT	25 U/L
Albumin	34 g/L

What is the most likely diagnosis?

- ☐ Gilbert's syndrome
- ☐ Gallstones
- ☐ Acute fatty liver
- ☐ Intrahepatic cholestasis of pregnancy
- ☐ Primary biliary cirrhosis

Dr Assem

Gilbert's syndrome	39%
Gallstones	5%
Acute fatty liver	6%
Intrahepatic cholestasis of pregnancy	45%
Primary biliary cirrhosis	6%

An isolated rise in bilirubin in response to physiological stress is typical of Gilbert's syndrome

Important for me Less important

Morning sickness and pruritus are common in pregnant women. Intrahepatic cholestasis of pregnancy would not occur in the first trimester.

The ALP may be elevated during pregnancy but is not typically significantly elevated until the third trimester. Bilirubin usually falls in pregnancy.

The most likely diagnosis is, therefore, Gilbert's syndrome.

A 31-year-old woman who initially presented with abdominal pain and constipation is diagnosed with irritable bowel syndrome. Which one of the following bits of dietary advice is it least suitable to give?

- ☐ Avoid missing meals
- ☐ Restrict tea and coffee to 3 cups per day
- ☐ Increase the intake of fibre such as bran and wholemeal bread
- ☐ Reduce intake of alcohol
- ☐ Drink at least 8 cups of fluid per day

Avoid missing meals

12%

Restrict tea and coffee to 3 cups per day

15%

Increase the intake of fibre such as bran and wholemeal bread

55%

Reduce intake of alcohol

7%

Drink at least 8 cups of fluid per day

10%

Insoluble sources of fibre such as bran and wholemeal should be avoided in IBS

Important for me Less important

A 35-year-old lady presents to the emergency department with right upper quadrant pain. She has also noticed that her skin seems slightly yellower over the last week or so and you notice a yellow tinge to her sclera. On further questioning, she complains of itching of her arms. Her only past medical history of note includes ulcerative colitis for which she takes mesalazine.

Given her presentation, what is the best investigation to diagnose the most likely underlying condition?

- ☐ ANCA antibody testing
- ☐ ERCP (endoscopic retrograde cholangiopancreatography)
- ☐ Serum transaminase levels
- ☐ Liver ultrasound
- ☐ Liver biopsy

ANCA antibody testing

17%

ERCP (endoscopic retrograde cholangiopancreatography)

55%

Serum transaminase levels

8%

Liver ultrasound

12%

Liver biopsy

7%

ERCP is the investigation of choice in primary sclerosing cholangitis

Important for me Less important

This question is asking about a 35-year-old woman presenting with jaundice, right upper quadrant pain and pruritus on a background of ulcerative colitis. This is the typical pattern of primary sclerosing cholangitis. The best diagnostic investigation for primary sclerosing cholangitis is ERCP.

ANCA antibody testing may be helpful as ANCA antibodies may be positive in these patients, however, it would not be diagnostic as it can be positive in many conditions including granulomatosis with polyangiitis or Churg–Strauss syndrome.

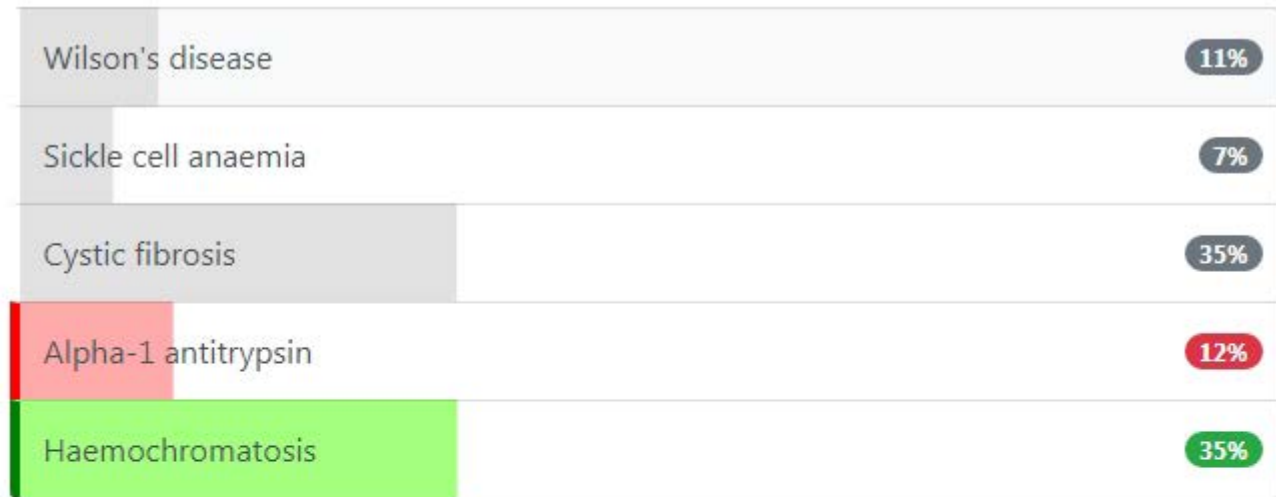
Serum transaminase levels will help point towards a diagnosis of primary sclerosing cholangitis, however, will not be diagnostic. They are a very general marker for liver damage and in primary sclerosing cholangitis they can either be normal or raised.

A liver ultrasound will likely be the first investigation used in this woman's case to look for any other likely causes of her jaundice and pain, such as gallstones. In primary sclerosing cholangitis, you may see bile duct dilatation, however, this would not be diagnostic.

A liver biopsy can be used to help in the staging of primary sclerosing cholangitis however it is not used in its diagnosis.

Which one of the following genetic conditions is the most prevalent in a Caucasian population?

- ☐ Wilson's disease
- ☐ Sickle cell anaemia
- ☐ Cystic fibrosis
- ☐ Alpha-1 antitrypsin
- ☐ Haemochromatosis



Haemochromatosis is more common than cystic fibrosis

Important for me Less important

Haemochromatosis is an autosomal recessive disorder with a carrier rate of 1 in 10 and is present in about 1 in 200-400 people. Cystic fibrosis (CF) has a carrier rate of 1 in 25 and is present in about 1 in 2,500 births. CF is often quoted as being the most common lethal inherited condition in Caucasians

A 30-year-old woman is investigated for chronic diarrhoea, bloating and tiredness. A diagnosis of coeliac disease is suspected. Which one of the following factors would increase the likelihood of a false negative serology test?

- ☐ Hyposplenism
- ☐ Being on a gluten free diet for one week prior to the test
- ☐ A course of prednisolone one week prior to the test
- ☐ The presence of dermatitis herpetiformis
- ☐ Selective IgA deficiency

Hyposplenism	3%
Being on a gluten free diet for one week prior to the test	41%
A course of prednisolone one week prior to the test	10%
The presence of dermatitis herpetiformis	3%
Selective IgA deficiency	43%

Selective IgA deficiency is more common in patients with coeliac disease. For this reason IgA levels should be checked when serological tests are ordered. If the patient has selective IgA deficiency tissue transglutaminase IgG can be measured.

Patients normally need to be following a gluten-free diet for at least 6 months before the serology becomes negatives.

Which one of the following is least likely to cause malabsorption?

- ☐ Systemic sclerosis
- ☐ Cystic fibrosis
- ☐ Primary biliary cirrhosis
- ☐ Whipple's disease
- ☐ Haemochromatosis

Systemic sclerosis

15%

Cystic fibrosis

7%

Primary biliary cirrhosis

9%

Whipple's disease

5%

Haemochromatosis

64%

A 34-year-old HIV positive man is referred to gastroenterology due to jaundiced sclera. Liver function tests are as follows:

Albumin	34 g/l
ALP	540 iu/l
Bilirubin	67 μ mol/l
ALT	45 iu/l

What is the most likely diagnosis?

- ☐ Hepatic abscess
- ☐ Fungal obstruction of the bile duct
- ☐ Duodenal adenoma
- ☐ Primary biliary cirrhosis
- ☐ Sclerosing cholangitis

Condition	Percentage
Hepatic abscess	6%
Fungal obstruction of the bile duct	17%
Duodenal adenoma	2%
Primary biliary cirrhosis	22%
Sclerosing cholangitis	54%

Hepatic abscess

6%

Fungal obstruction of the bile duct

17%

Duodenal adenoma

2%

Primary biliary cirrhosis

22%

Sclerosing cholangitis

54%

The LFTs clearly show a cholestatic picture. Given the background of HIV the most likely cause is sclerosing cholangitis

A 36-year-old male is seen in hepatology outpatients with a repeat hepatitis screen. He describes a 1-week history of anorexia, fatigue and jaundice. On examination there was no peripheral stigmata of chronic liver disease, JVP 3cm, mild scleral icterus, abdomen was soft, non-tender, with 2cm regular liver edge.

Key:

HBs Ag	Hepatitis B surface antigen
HBe Ag	Hepatitis B E antigen
HB DNA	Hepatitis B DNA titre
Anti-HBs	Anti Hepatitis B surface antibody
Anti-HBc IgM	Anti Hepatitis B core antibody
Anti-HD IgM	Anti Hepatitis D IgM antibody

Bloods: 6 months ago

HBs Ag	positive
HBe Ag	positive
HB DNA	positive
Anti HBs	negative
Anti HBc IgM	positive
Anti HD IgM	negative

Bloods: Today

HBs Ag	positive
HBe Ag	positive
HB DNA	positive
Anti HBs	negative
Anti HBc IgM	positive
Anti HD IgM	positive

What terminology best describes the patients hepatitis results?

- ☐ Hepatitis B positive and a superinfection with hepatitis D
- ☐ Hepatitis B positive and a co-infection with hepatitis D
- ☐ Hepatitis B vaccination and an active hepatitis D infection
- ☐ Cleared hepatitis B infection and an active hepatitis D infection
- ☐ Chronic hepatitis B only

Hepatitis B positive and a superinfection with hepatitis D

51%

Hepatitis B positive and a co-infection with hepatitis D

32%

Hepatitis B vaccination and an active hepatitis D infection

6%

Cleared hepatitis B infection and an active hepatitis D infection

6%

Chronic hepatitis B only

6%

A patient is recovering in the gastroenterology ward after an upper gastrointestinal variceal bleed. He has ascites and jaundice as a result of a chronic hepatitis C infection. His routine blood tests come back showing impaired renal function. The results are shown below. They were normal 3 days ago when he was admitted. Urinalysis shows no protein or blood.

Na ⁺	140 mmol/l
K ⁺	3.8 mmol/l
Urea	11.2 mmol/l
Creatinine	302 μmol/l

Given this man's presentation, what is the most likely diagnosis?

- ☐ Renal calculi
- ☐ Focal segmental glomerulonephritis
- ☐ Type-1 hepatorenal syndrome
- ☐ Type -2 hepatorenal syndrome
- ☐ Minimal change glomerulonephritis

Renal calculi

2%

Focal segmental glomerulonephritis

5%

Type-1 hepatorenal syndrome

72%

Type -2 hepatorenal syndrome

18%

Minimal change glomerulonephritis

3%

Speed of onset can help to differentiate the type of hepatorenal syndrome

Important for me Less important

This question is asking about a patient currently admitted to hospital following an upper GI bleed. The patient is suffering from chronic liver failure and then goes onto develop renal failure. This is the typical history of hepatorenal syndrome.

Hepatorenal syndrome is split into type 1 and 2. Type 1 is a rapid onset hepatorenal syndrome (less than two weeks). This typically occurs following an acute event such as an upper GI bleed. Type 2 is a more gradual decline in renal function and is generally associated with refractory ascites. Therefore as his blood tests were normal 3 days ago this is type 1.

Renal calculi would present with loin to groin pain as well as blood in the urine.

In focal segmental glomerulonephritis or minimal change glomerulonephritis, you would expect to see protein or blood in the urine and their absence helps to rule these out.

A 38-year-old female with a long history of alcohol excess presents with abdominal pain, weight loss and bulky stools. What is the most suitable investigation to confirm the diagnosis?

- ☐ Endoscopic ultrasound
- ☐ Endoscopic retrograde cholangiopancreatography
- ☐ Ultrasound abdomen
- ☐ CT abdomen
- ☐ Endoscopy with D2 biopsy

Endoscopic ultrasound

5%

Endoscopic retrograde cholangiopancreatography

19%

Ultrasound abdomen

17%

CT abdomen

52%

Endoscopy with D2 biopsy

7%

CT pancreas is the preferred diagnostic test for chronic pancreatitis - looking for pancreatic calcification

Important for me Less important

This patient has chronic pancreatitis. CT is the most sensitive method to detect the characteristic pancreatic calcification which is associated with the condition

Dr Assem

A 30-year-old woman presents with a three-month history of indigestion. There is no history of weight loss, anorexia, dysphagia, vomiting or change in bowel habit and abdominal examination is unremarkable. Which one of the following may decrease the accuracy of a ^{13}C -urea breath test?

- ☐ Use of Gaviscon around 10 days ago
- ☐ Use of ranitidine stopping 4 weeks ago
- ☐ Course of amoxicillin stopping 3 weeks ago
- ☐ Use of lansoprazole stopping 6 weeks ago
- ☐ Current use of the combined oral contraceptive pill

Use of Gaviscon around 10 days ago

13%

Use of ranitidine stopping 4 weeks ago

9%

Course of amoxicillin stopping 3 weeks ago

54%

Use of lansoprazole stopping 6 weeks ago

12%

Current use of the combined oral contraceptive pill

12%

Urea breath test - no antibiotics in past 4 weeks, no antisecretory drugs (e.g. PPI) in past 2 weeks

Important for me Less important

A 52-year-old man presented to the emergency department with nausea and vomiting that started 2 hours ago. The vomiting contains some food content but there is no blood. He also complains of abdominal pain but is unable to point to a specific location for the pain on his abdomen. On examination, he has a heart rate of 88 beats per minute, a respiratory rate of 18 breaths per minute and blood pressure of 143/90 mmHg. The emergency physician notices that he has very red palms and his abdomen shows ascites. The blood results are as shown below.

Hb	130 g/l
AST	82 u/l
ALT	38 u/l

Upon further questioning, the man reveals that he used to engage in binge drinking and he currently consumes more than 60 units of alcohol every week since he got divorced 15 years ago and recently lost his job. Upon liver biopsy, which of the following pathological features is likely to be observed?

- Excess collagen and extracellular matrix deposition in periportal and pericentral zones leading to the formation of regenerative nodules
- Macrovesicular fatty change with giant mitochondria, spotty necrosis and fibrosis
- Triglyceride accumulation with the proliferation of myofibroblasts
- Mononuclear infiltration of liver lobules with hepatocytes necrosis and Kupffer cells hyperplasia
- Dense lymphoid infiltrates of hepatic portal tracts with chronic inflammation and hepatocytes necrosis

Excess collagen and extracellular matrix deposition in periportal and pericentral zones leading to the formation of regenerative nodules

34%

Macrovesicular fatty change with giant mitochondria, spotty necrosis and fibrosis

21%

Triglyceride accumulation with the proliferation of myofibroblasts

6%

Mononuclear infiltration of liver lobules with hepatocytes necrosis and Kupffer cells hyperplasia

22%

Dense lymphoid infiltrates of hepatic portal tracts with chronic inflammation and hepatocytes necrosis

16%

This man presented with the signs and symptoms of liver cirrhosis. His history of heavy alcohol intake, nausea, and vomiting along with examination findings of ascites and palmar erythema are consistent with such a diagnosis. He also had elevated liver enzymes.

1: This pathological feature is typical of liver cirrhosis. Excessive alcohol consumption damages hepatocytes through the formation of reactive oxygen species. Kupffer cells activation occurs and excessive profibrotic cytokines are produced leading to excessive fibrous tissue formation.

2: This pathology is related to alcohol consumption. However, it does not indicate that cirrhosis has taken place. It characterizes alcohol steatohepatitis and it may reverse with if the person stops consuming alcohol.

3: This indicates non-alcoholic fatty liver disease. It is a common condition in individuals with insulin resistance, dyslipidemia and a fatty diet.

4: This pathology is common to livers infected with the viral hepatitis viruses. Hepatitis virus A and E leads to acute hepatitis, while B and C lead to chronic hepatitis. Hepatitis virus D only affects liver if there is current or past infection with hepatitis B virus.

5: This pathology is characteristic of primary biliary cirrhosis. It is liver condition seen mostly in females and affects small to medium-sized bile ducts. About 90% of patient with this condition have anti-mitochondrial antibodies.

A baby is born to a mother who is known to have chronic hepatitis B. The mother's latest results are as follows:

HBsAg	Positive
HBeAg	Positive

What is the most appropriate strategy for reducing the vertical transmission rate?

- ☐ Give the newborn hepatitis B vaccine + hepatitis B immunoglobulin
- ☐ Give the newborn hepatitis B vaccine
- ☐ Give the newborn hepatitis B immunoglobulin
- ☐ Give the mother intravenous zidovudine during labour
- ☐ Give the mother hepatitis B immunoglobulin shortly before birth + the newborn hepatitis B vaccine

Give the newborn hepatitis B vaccine + hepatitis B immunoglobulin

60%

Give the newborn hepatitis B vaccine

3%

Give the newborn hepatitis B immunoglobulin

8%

Give the mother intravenous zidovudine during labour

7%

Give the mother hepatitis B immunoglobulin shortly before birth + the newborn hepatitis B vaccine

23%

HBeAg is a marker of infectivity. The Green Book guidelines advise giving both the vaccine and immunoglobulin in this situation. If the patient had antibodies against HBe (anti-HBe), rather than the HBe antigen as in this scenario, then only the vaccine would need to be given. Please see the link for more details.

A 20 year-old female presents with a rash on the extensor aspect of her arms. It is intensely itchy. She gives a history of fatigue and diarrhoea for the last few months, but has been unable to book an appointment until now. Her past medical history includes recurrent chest, urine and ear infections throughout childhood requiring multiple courses of antibiotics. She still occasionally suffers with infections. On examination there is a blistering rash around both elbows. You suspect dermatitis herpetiformis and coeliac disease, and send off a coeliac disease blood test. She is started on a gluten free diet and improves. In the meantime her blood test comes back negative.

What is the likely explanation for the negative test result?

- ☐ She has gluten intolerance and eczema that has responded to dietary measures
- ☐ She has selective IgA deficiency
- ☐ Her history is too short for the test to be positive
- ☐ She has Crohn's disease
- ☐ She has low immunoglobulins due to recent infection

She has gluten intolerance and eczema that has responded to dietary measures 16%

She has selective IgA deficiency 65%

Her history is too short for the test to be positive 5%

She has Crohn's disease 3%

She has low immunoglobulins due to recent infection 10%

The history of recurrent infections is suggestive of an immunodeficiency. The rest of the history is highly suggestive of coeliac disease with dermatitis herpetiformis. Testing for coeliac disease usually involves IgA tissue transglutaminase (TTG) antibodies. If however, like in this case, a patient is IgA deficient, they will test negative for coeliac disease. An alternative test for coeliac's would be IgG TTG antibodies.

Another possibility in this case would be that she was on a gluten free diet, however this is not given as an option.

A 41-year-old alcoholic is admitted with a suspected variceal haemorrhage. Terlipressin is given. What is the main mechanism of action of terlipressin?

- ☐ Portal system vasodilation
- ☐ Antifibrinolytic
- ☐ Constriction of hepatic venules
- ☐ Endothelin-1 antagonist
- ☐ Constriction of the splanchnic vessels

Portal system vasodilation

9%

Antifibrinolytic

2%

Constriction of hepatic venules

5%

Endothelin-1 antagonist

9%

Constriction of the splanchnic vessels

74%

Terlipressin - method of action = constriction of the splanchnic vessels

Important for me Less important

Which one of the following patients is most likely to require screening for hepatocellular carcinoma?

- ☐ A 45-year-old man with liver cirrhosis secondary to hepatitis C
- ☐ A 33-year-old man with HIV. He is taking antiretroviral therapy
- ☐ A 22-year-old man with alpha-1 antitrypsin deficiency. He has no evidence of current liver disease
- ☐ A 52-year-old woman with alcohol-related liver cirrhosis who is still drinking
- ☐ A 75-year-old man who drinks 100 units / week. He has no current signs of liver disease

A 45-year-old man with liver cirrhosis secondary to hepatitis C

77%

A 33-year-old man with HIV. He is taking antiretroviral therapy

2%

A 22-year-old man with alpha-1 antitrypsin deficiency. He has no evidence of current liver disease

4%

A 52-year-old woman with alcohol-related liver cirrhosis who is still drinking

14%

A 75-year-old man who drinks 100 units / week. He has no current signs of liver disease

3%

Patients with liver cirrhosis secondary to hepatitis C have a 3-5% annual incidence of hepatocellular carcinoma.

A 45-year-old man presents with diarrhoea, abdominal cramps and 5kg weight loss over 6 months. He has a past medical history of Hashimoto's thyroiditis and gallstones. He has an endoscopy and biopsies taken which show villous atrophy in the intestinal mucosa. Which of the following human leukocyte antigen (HLA) genes is most strongly associated with this disease?

☐ HLA-DQ2

☐ HLA-B27

☐ HLA-DQ4

☐ HLA-DR4

☐ HLA-C13

HLA-DQ2	61%
HLA-B27	10%
HLA-DQ4	13%
HLA-DR4	13%
HLA-C13	3%

Coeliac disease has a strong association with HLA-DQ2 (present in 95% of patients)

Important for me Less important

The correct answer is 2. This man is presenting with coeliac disease, as evidenced by his symptoms and biopsy findings. HLA-DQ2 is found in up to 95% of patients with coeliac disease.

The human leukocyte antigen (HLA) gene family produces HLA proteins in two classes which are found on the surface of cells and display antigens to cells of the immune system. They are involved in a number of inflammatory and autoimmune conditions.

NICE: Coeliac disease

<https://www.nice.org.uk/guidance/ng20>

Dr Assem

A 35-year-old man with a strong family history of colorectal cancer is noted to have hundreds of polyps during a colonoscopy.

Which one of the following genes is most likely to have a mutation?

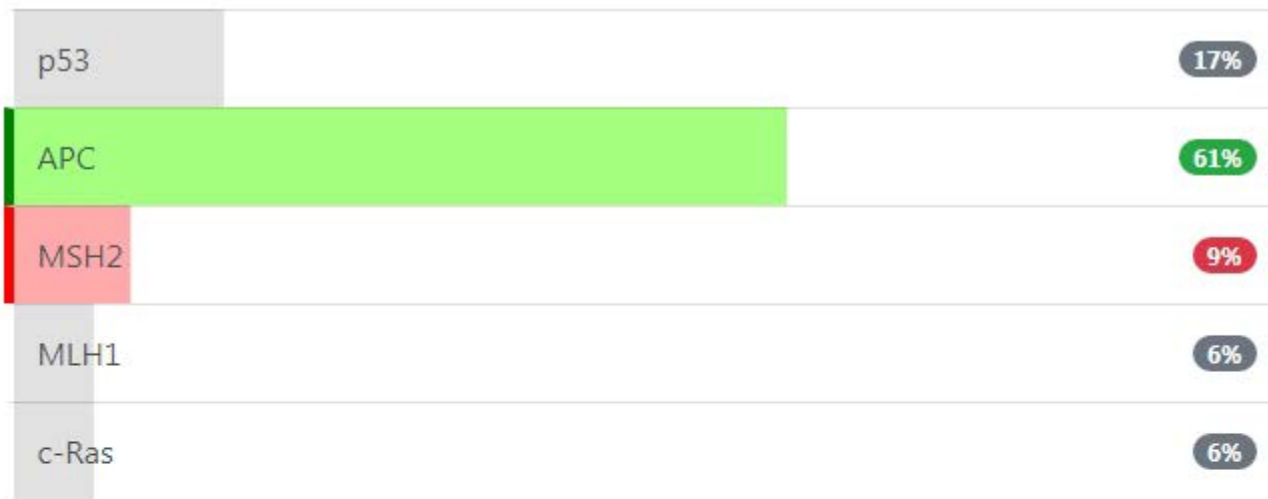
☐ p53

☐ APC

☐ MSH2

☐ MLH1

☐ c-Ras



Familial adenomatous polyposis is due to a mutation in a tumour suppressor gene called adenomatous polyposis coli gene (APC)

Important for me [Less important](#)

Having hundreds of colonic polyps is very suggestive of familial adenomatous polyposis, a condition caused by a mutation in a tumour suppressor gene called adenomatous polyposis coli gene (APC).

A 55-year-old man is brought into the emergency department by the paramedics. He collapsed on the street suffering from a myocardial infarction and subsequently resuscitated following a cardiac arrest. Follow up blood tests are sent and the results show impaired liver function. He regularly has liver function tests as he is on a statin, and at his appointment last week they had been normal. There is nothing to note on examination and he is currently not complaining of any pain.

ALT	1400 u/l
-----	----------

Given this man's presentation, what is the most likely cause of his impaired liver function tests?

- ☐ Hepatitis B
- ☐ Chronic alcohol abuse
- ☐ Ischaemic hepatitis
- ☐ Budd-Chiari syndrome
- ☐ Wilson's disease

Hepatitis B	3%
Chronic alcohol abuse	3%
Ischaemic hepatitis	87%
Budd-Chiari syndrome	5%
Wilson's disease	2%

Liver failure following cardiac arrest think ischaemic hepatitis

Important for me [Less important](#)

This question is asking about a 55-year-old man presenting following a cardiac arrest and then having impaired liver function tests. This is a typical picture of ischemic hepatitis.

Hepatitis and chronic alcohol abuse would not cause such an acute rise in this man liver function tests, and would most likely have been picked up by the GP.

Budd-Chiari syndrome characteristically presents with right upper quadrant pain associated with refractor ascites. And so this does not match his clinical picture.

Wilson's disease typically presents in teenagers or people in their twenties with neurological symptoms followed by liver failure. This does not match this patients presentation.

Which one of the following features of haemochromatosis may be reversible with treatment?

- ☐ Cardiomyopathy
- ☐ Hypogonadotropic hypogonadism
- ☐ Diabetes mellitus
- ☐ Arthropathy
- ☐ Liver cirrhosis

Cardiomyopathy

57%

Hypogonadotropic hypogonadism

8%

Diabetes mellitus

12%

Arthropathy

15%

Liver cirrhosis

8%

In haemochromatosis, cardiomyopathy and skin pigmentation are reversible with treatment

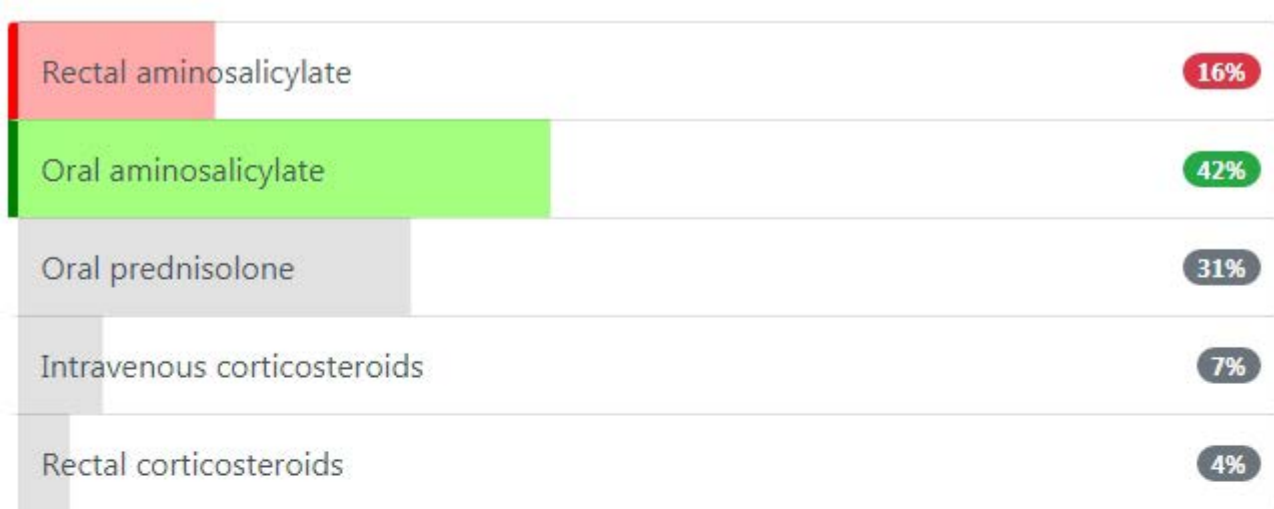
Important for me Less important

A 27-year-old woman is investigated for bloody diarrhoea. This started around six weeks ago. She is currently passing 3-4 loose motions a day which normally contain a small amount of blood. Other than feeling lethargic she remains systemically well with no fever or significant abdominal pain. A colonoscopy is performed which shows inflammatory changes in the ascending colon consistent with ulcerative colitis. Bloods show the following:

Hb	14.2 g/dl
Platelets	$323 \times 10^9/l$
WBC	$8.1 \times 10^9/l$
CRP	22 mg/l

What is the most appropriate first-line medication to induce remission?

- ☐ Rectal aminosalicylate
- ☐ Oral aminosalicylate
- ☐ Oral prednisolone
- ☐ Intravenous corticosteroids
- ☐ Rectal corticosteroids



This patient has symptoms consistent with mild/moderate ulcerative colitis. As she has disease outside the reach of enemas she should be given an oral aminosalicylate first-line.

NICE state the following:

To induce remission in adults with a mild to moderate first presentation or inflammatory exacerbation of left-sided or extensive ulcerative colitis:

- *offer a high induction dose of an oral aminosalicylate*
- *consider adding a topical aminosalicylate or oral beclometasone dipropionate, taking into account the person's preferences.*

A 62-year-old woman with a history of scleroderma is reviewed. For the past few months she has suffered with recurrent bouts of diarrhoea. During these bouts her stools are pale, bulky and offensive. She drinks 14 units of alcohol/week. Bloods show the following:

Hb	10.8 g/dl
Platelets	231 * 10 ⁹ /l
WBC	5.4 * 10 ⁹ /l
Ferritin	14 ng/ml
Vitamin B12	170 ng/l
Folate	2.2 nmol/l

Na ⁺	142 mmol/l
K ⁺	3.4 mmol/l
Urea	4.5 mmol/l
Creatinine	77 µmol/l

Bilirubin	21 µmol/l
ALP	88 u/l
ALT	21 u/l
γGT	55 u/l
Albumin	36 g/l

Which one of the following complications is most likely to have occurred?

- ☐ Whipple's disease
- ☐ Colonic hypomotility
- ☐ Chronic pancreatitis
- ☐ Malabsorption syndrome
- ☐ Ileal stenosis

Whipple's disease

9%

Colonic hypomotility

4%

Chronic pancreatitis

21%

Malabsorption syndrome

61%

Ileal stenosis

4%

Malabsorption syndrome is a very common complication of scleroderma (systemic sclerosis). The bloods show evidence of impaired absorption of some vitamins (B12, folate), nutrients (iron) and protein (low albumin).

Crohn's disease is associated with each one of the following findings, except:

- ☐ Inflammation confined to the mucosa and submucosa
- ☐ Non-caseating granulomas
- ☐ Rose-thorn ulcers
- ☐ Cobblestone pattern
- ☐ Fistulas

Inflammation confined to the mucosa and submucosa

70%

Non-caseating granulomas

8%

Rose-thorn ulcers

11%

Cobblestone pattern

6%

Fistulas

5%

According to recent NICE guidelines, which one of the following may have a role in the management of irritable bowel syndrome?

☐ Reflexology

☐ Acupuncture

☐ Aloe vera

☐ Homeopathy

☐ Hypnotherapy

Reflexology

13%

Acupuncture

26%

Aloe vera

10%

Homeopathy

9%

Hypnotherapy

43%

Which one of the following types of bariatric surgery is most likely to cause significant malabsorption?

- ☐ Laparoscopic-adjustable gastric banding
- ☐ Roux-en-Y gastric bypass surgery
- ☐ Biliopancreatic diversion with duodenal switch
- ☐ Sleeve gastrectomy
- ☐ Intra-gastric balloon

Laparoscopic-adjustable gastric banding

4%

Roux-en-Y gastric bypass surgery

41%

Biliopancreatic diversion with duodenal switch

44%

Sleeve gastrectomy

9%

Intragastric balloon

2%

Biliopancreatic diversion with duodenal switch is a primarily malabsorptive procedure and reserved for patients who are very obese.

You are asked to review a 78-year-old woman with a non-healing leg ulcer by the ward nurse. You notice she is very thin. What is the most appropriate tool to screen for malnutrition?

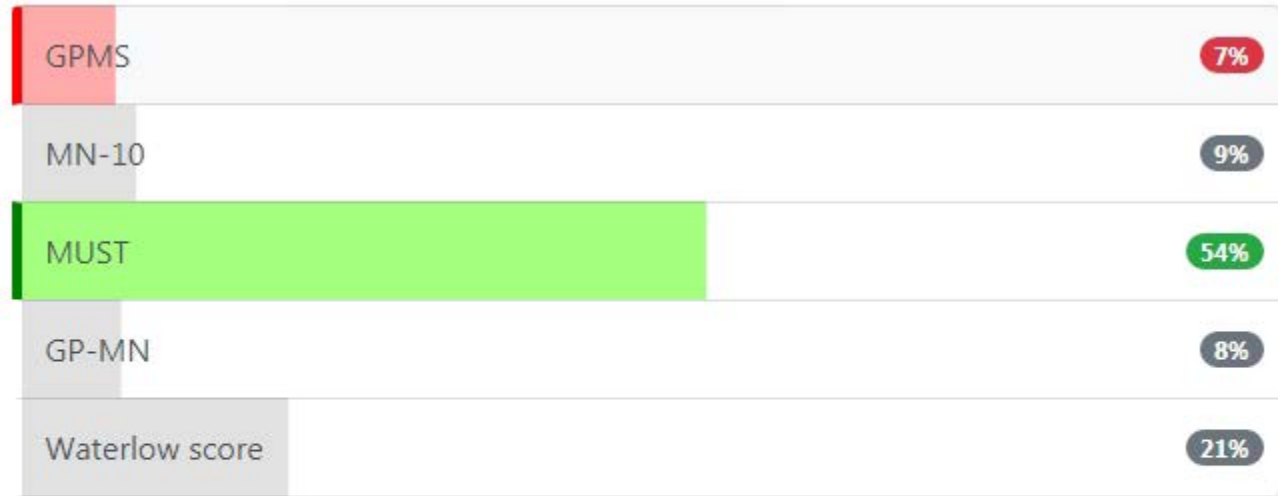
☐ GPMS

☐ MN-10

☐ MUST

☐ GP-MN

☐ Waterlow score



The Waterlow score is used to estimate the risk of a patient developing a pressure sore. Whilst this includes an assessment of malnutrition as one of its components the Waterlow score is not designed to screen for malnutrition.

Dr Assem

A 57-year-old man who has had multiple emergency department admissions for alcohol related injuries and admissions under the general medical team for alcohol withdrawal, presents acutely unwell after a twelve day drinking binge. He is icteric, confused and has hepatomegaly. There are stigmata of chronic liver disease. Admission blood work shows a thrombocytopenia, transaminitis with hyperbilirubinemia and a severe coagulopathy. A diagnosis of severe acute alcoholic hepatitis is made. With respect to the coagulopathy associated with liver disease, which clotting factor is characteristically increased?

☐ Factor VIII

☐ Factor II

☐ Factor IX

☐ Factor VII

☐ Factor XII

Factor VIII

48%

Factor II

10%

Factor IX

12%

Factor VII

16%

Factor XII

14%

Which one of the following is least associated with hepatocellular carcinoma?

- ☐ Hepatitis C
- ☐ Primary biliary cirrhosis
- ☐ Aflatoxin
- ☐ Wilson's disease
- ☐ Haemochromatosis

Hepatitis C

3%

Primary biliary cirrhosis

14%

Aflatoxin

13%

Wilson's disease

56%

Haemochromatosis

15%

A 45-year-old man with on-going constipation presents to his physician hoping to get some laxatives. He has been eating and drinking well, and apart from constipation, does not have any significant medical history. He does not drink alcohol but smokes occasionally when out with friends.

The physician wants to prescribe a laxative to help resolve the patient's constipation, however, laxatives like any other medication have adverse effects that should be considered before prescribing.

Which one of the following laxatives is shown to have to carcinogenic potential?

- ☐ Lactulose
- ☐ Husk
- ☐ Senna
- ☐ Co-danthramer
- ☐ Bisacodyl

Lactulose

9%

Husk

8%

Senna

21%

Co-danthramer

50%

Bisacodyl

12%

Co-danthramer is genotoxic and should only be prescribed to palliative patients due to its carcinogenic potential

Important for me Less important

Co-danthramer has been shown to be carcinogenic and therefore is not normally prescribed. The only exception is in the case of palliative patients where it can be prescribed, especially if constipation is not improved by the other laxatives.

The use of co-danthramer and co-danthrusate is limited to constipation in terminally ill patients because of potential carcinogenicity (based on animal studies) and evidence of genotoxicity. (BNF)

The rest of the laxatives are not known to be carcinogenic. A thorough history will help dictate which laxative would be the best option for this patient.

In all patients with constipation, an increase in dietary fibre, adequate fluid intake and exercise is advised. Diet should be balanced and contain whole grains, fruits and vegetables. Fibre intake should be increased gradually (to minimise flatulence and bloating). The effects of a high-fibre diet may be seen in a few days although it can take as long as 4 weeks. Adequate fluid intake is important (particularly with a high-fibre diet or fibre supplements), but can be difficult for some people (for example, the frail or elderly). Fruits high in fibre and sorbitol, and fruit juices high in sorbitol can help prevent and treat constipation.

A 22-year-old woman who is 34 weeks into her first pregnancy presents to the emergency department with severe epigastric pain and profuse vomiting. Her concerned partner tells you that she has no other significant past medical history and that she has attended all of her pregnancy checks. These have all been normal. On examination she is tender in the epigastrium. Her reflexes are mildly brisk and she does not have any clonus. Her blood pressure is 124/55 mmHg. You note that she is confused and point of care glucose monitoring reads 'low'. Her laboratory results return showing the following:

Hb	110 g/l	Na ⁺	132 mmol/l	Bilirubin	94 µmol/l
Platelets	123 * 10 ⁹ /l	K ⁺	4.9 mmol/l	ALP	173 u/l
WBC	11 * 10 ⁹ /l	Urea	8.5 mmol/l	ALT	676 u/l
Neuts	9.0 * 10 ⁹ /l	Creatinine	98 µmol/l	AST	590 u/l
Lymphs	2.0 * 10 ⁹ /l	CRP	15 mg/l	Albumin	29 g/l
INR	2.2	Urine PCR	5	Glucose	1.8 mmol/l

A blood film shows no evidence of haemolysis.

What is the most likely diagnosis?

- ☐ Acute hepatitis A
- ☐ Pre-eclampsia
- ☐ HELLP Syndrome
- ☐ Acute fatty liver of pregnancy
- ☐ Cholestasis of pregnancy

Acute hepatitis A

8%

Pre-eclampsia

4%

HELLP Syndrome

31%

Acute fatty liver of pregnancy

43%

Cholestasis of pregnancy

15%

Acute fatty liver of pregnancy (AFLP) is a rare, potentially fatal complication that occurs in the third trimester or early postpartum period. Although the exact pathogenesis is unknown, this disease has been linked to an abnormality in foetal fatty acid metabolism. Early diagnosis of AFLP sometimes can be difficult because it shares features with other common conditions such as pre-eclampsia, viral hepatitis and cholestasis of pregnancy. However, a careful history and physical examination, in conjunction with compatible laboratory and imaging results, are often sufficient to make the diagnosis, and liver biopsy is rarely indicated. Supportive care and delivery of the baby are essential to optimal maternal-foetal outcomes and are the mainstay of treatment for AFLP.

A 55-year-old female with a history of colorectal node positive cancer, managed with resection and chemotherapy. She is found to have a single 2cm liver lesion a few years later. What is the most appropriate next step in her management?

- ☐ Radiofrequency ablation
- ☐ Transarterial chemoembolization
- ☐ Radiotherapy
- ☐ Metastatic lesion resection
- ☐ Chemotherapy

Radiofrequency ablation	13%
Transarterial chemoembolization	17%
Radiotherapy	8%
Metastatic lesion resection	48%
Chemotherapy	15%

Colorectal carcinoma is one of the only oncological diseases where the presence of a metastatic deposit can be treated with curative intent. A solitary liver lesion should be surgically resected. In fact, the purpose of following patients with CEA is to identify patients with solitary metastatic lesions amenable to surgical resection.

Transarterial chemoembolization & Radiofrequency ablation are used as palliative procedures when the lesions are too numerous or large to resect.

AJCCC Staging of Colorectal Cancer

Primary Tumor (T)

TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma in situ: intraepithelial or invasion of lamina propria
T1	Tumor invades submucosa
T2	Tumor invades muscularis propria
T3	Tumor invades through the muscularis propria into pericorectal tissues
T4a	Tumor penetrates to the surface of the visceral peritoneum
T4b	Tumor directly invades or is adherent to other organs or structures

Regional Lymph Nodes (N)

NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in 1-3 regional lymph nodes
N1a	Metastasis in one regional lymph node
N1b	Metastasis in 2-3 regional lymph nodes
N1c	Tumor deposit(s) in the subserosa, mesentery, or nonperitonealized pericolic or perirectal tissues without regional nodal metastasis
N2	Metastasis in 4 or more regional lymph nodes
N2a	Metastasis in 4-6 regional lymph nodes
N2b	Metastasis in 7 or more regional lymph nodes

Distant Metastasis (M)

M0	No distant metastasis
M1	Distant metastasis
M1a	Metastasis confined to one organ or site (for example, liver, lung, ovary, nonregional node)
M1b	Metastases in more than one organ/site or the peritoneum

A 65-year-old man known to have a carcinoid tumour of the appendix is found to have hepatic metastases. If the patient develops carcinoid syndrome, which one of the following symptoms is most likely to occur first?

☐ Facial flushing

☐ Headache

☐ Vomiting

☐ Diarrhoea

☐ Palpitations

Facial flushing

67%

Headache

6%

Vomiting

3%

Diarrhoea

20%

Palpitations

4%

Dr Assef

A 36-year-old man is reviewed in clinic. He has recently been started on mesalazine 400mg tds for ulcerative colitis. Which one of the following adverse effects is least likely to be attributable to mesalazine?

☐ Interstitial nephritis

☐ Headaches

☐ Acute pancreatitis

☐ Agranulocytosis

☐ Infertility

Interstitial nephritis

13%

Headaches

14%

Acute pancreatitis

18%

Agranulocytosis

13%

Infertility

42%

Sulphasalazine can cause oligospermia and infertility in men

Important for me Less important

Oligospermia is seen in patients taking sulphasalazine due to the sulphapyridine moiety, which is not present in mesalazine

A 54-year-old female is diagnosed with primary biliary cirrhosis. What is her increased risk of developing hepatocellular cancer, compared to a standard population?

- ☐ 50% increased risk
- ☐ 3-fold increased risk
- ☐ 5-fold increased risk
- ☐ 10-fold increased risk
- ☐ 20-fold increased risk

50% increased risk

8%

3-fold increased risk

14%

5-fold increased risk

22%

10-fold increased risk

28%

20-fold increased risk

28%

Which one of the following enzymes is mainly responsible for breaking starch down into sugars?

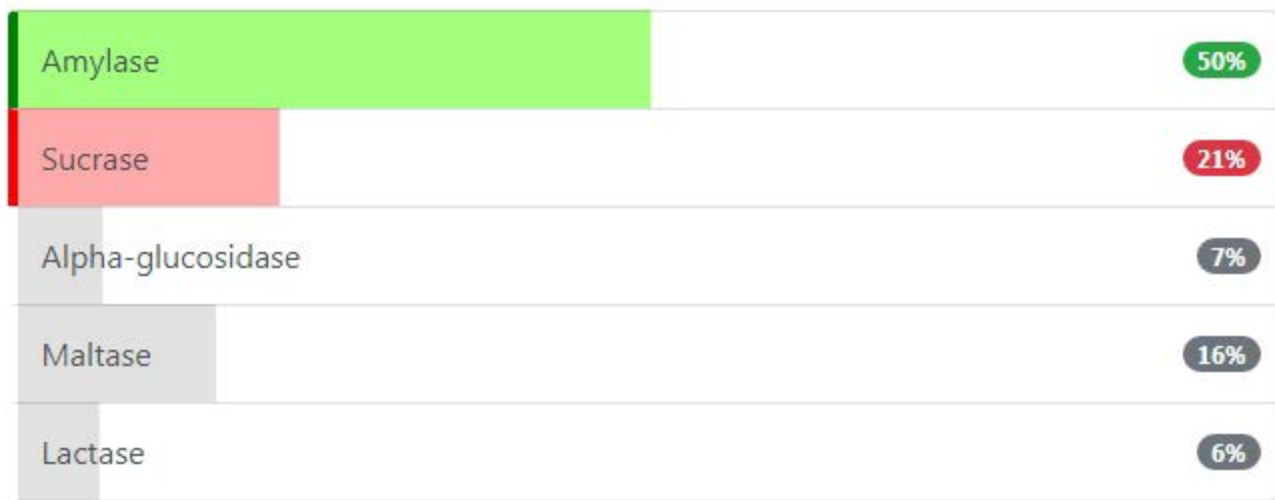
☐ Amylase

☐ Sucrase

☐ Alpha-glucosidase

☐ Maltase

☐ Lactase



Amylase: breaks starch down to sugars

Important for me Less important

What is the lifetime risk of developing colorectal cancer in the United Kingdom?

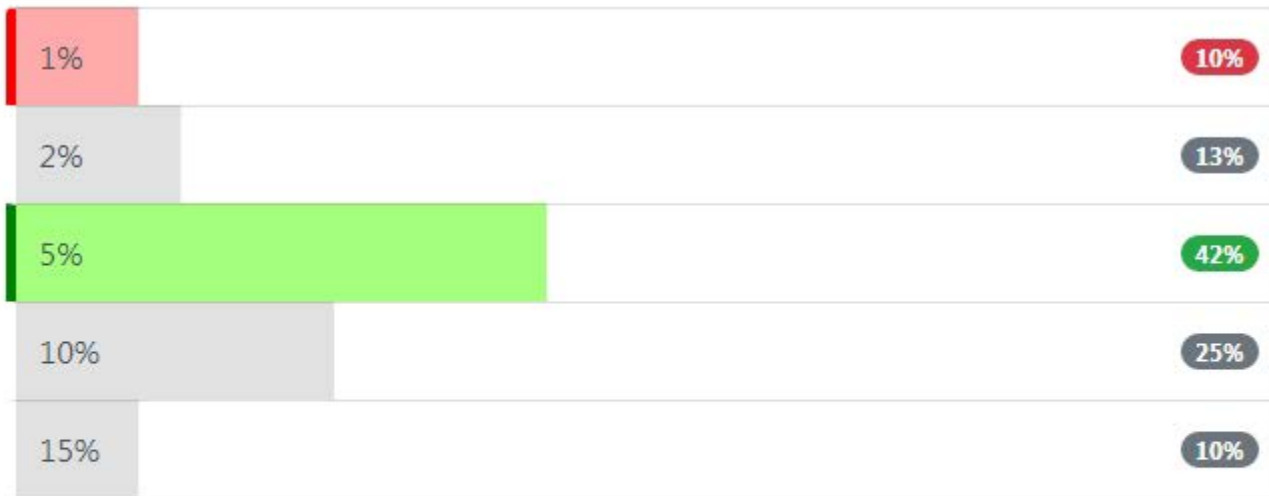
☐ 1%

☐ 2%

☐ 5%

☐ 10%

☐ 15%



Colorectal cancer is the third most common cancer in the UK, with approximately 30,000 new cases in England and Wales per year

A 65-year-old man with a history of ischaemic heart disease and hypertension presents to the emergency department with abdominal pain accompanied by some rectal bleeding. He has had associated diarrhoea. This has happened several times before, and tends to be mostly after eating a large meal. He had put off seeing a Doctor but his wife had insisted on him coming to hospital on this occasion.

On examination, the patient is well and the pain has subsided. A chest x-ray does not show any free air under the diaphragm and abdominal x-ray does not show any obstruction. He is discharged with colonoscopy booked as an outpatient.

Given the likely diagnosis, which part of the colon is most likely to be affected?

- ☐ Caecum
- ☐ Ascending colon
- ☐ Hepatic flexure
- ☐ Splenic flexure
- ☐ Rectum

Submit answer

Caecum	10%
Ascending colon	10%
Hepatic flexure	10%
Splenic flexure	45%
Rectum	25%

The splenic flexure is the most likely area to be affected by ischaemic colitis

Important for me

Less important

Given the history of ischaemic heart disease and hypertension an ischaemic cause of the pain is likely. Add to this the pain gets worse after eating, when the bowel requires more blood flow for its increased energy demands for digestion and ischaemic colitis would be the diagnosis to investigate first.

This is an anatomy question testing knowledge of 'watershed' areas (areas where arterial blood supplies change from one major vessel to the next). These areas are most vulnerable to reduced blood supply as they are the most distal parts of the distribution from their supplying arteries. The splenic flexure marks the point where the majority of blood supplied changes from the superior mesenteric artery (SMA) to the inferior mesenteric artery (IMA).

The SMA supplies the caecum, ascending colon, and hepatic flexure.

The rectum itself gets an excellent supply of blood from collaterals due to branches from the internal iliac artery.

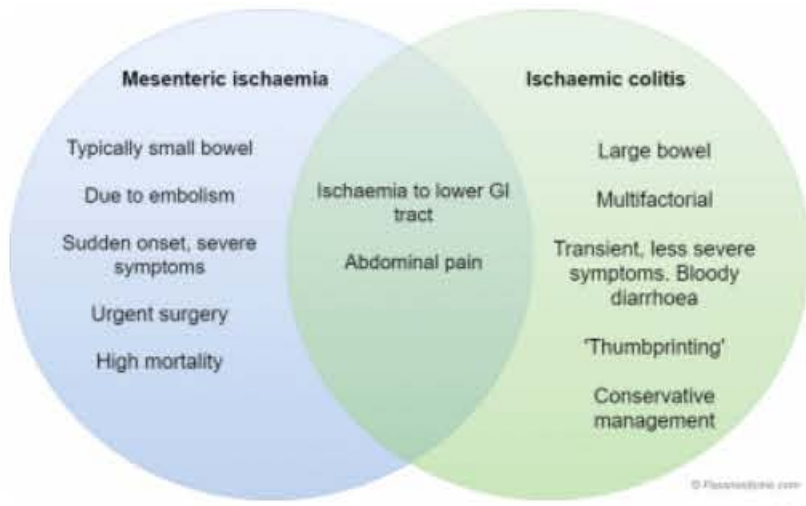
The recto-sigmoid junction also forms a watershed area but this is less often examined and was not a choice here.

Next question >

Ischaemia to the lower gastrointestinal tract

Ischaemia to the lower gastrointestinal tract can result in a variety of clinical conditions. Whilst there is no standard classification it can be useful to separate cases into 3 main conditions

- acute mesenteric ischaemia
- chronic mesenteric ischaemia
- ischaemic colitis



Venn diagram showing types of bowel ischaemia

Common features in bowel ischaemia

Common predisposing factors

- increasing age
- atrial fibrillation - particularly for mesenteric ischaemia
- other causes of emboli: endocarditis, malignancy
- cardiovascular disease risk factors: smoking, hypertension, diabetes
- cocaine: ischaemic colitis is sometimes seen in young patients following cocaine use

Common features

- abdominal pain - in acute mesenteric ischaemia this is often of sudden onset, severe and out-of-keeping with physical exam findings
- rectal bleeding
- diarrhoea
- fever
- bloods typically show an elevated white blood cell count associated with a lactic acidosis

Diagnosis

- CT is the investigation of choice

Acute mesenteric ischaemia

Acute mesenteric ischaemia is typically caused by an embolism resulting in occlusion of an artery which supplies the small bowel, for example the superior mesenteric artery. Classically patients have a history of atrial fibrillation.

The abdominal pain is typically severe, of sudden onset and out-of-keeping with physical exam findings.

Management

- urgent surgery is usually required
- poor prognosis, especially if surgery delayed

Chronic mesenteric ischaemia

Chronic mesenteric ischaemia is a relatively rare clinical diagnosis due to it's non-specific features and may be thought of as 'intestinal angina'. Colicky, intermittent abdominal pain occurs.

Ischaemic colitis

Ischaemic colitis describes an acute but transient compromise in the blood flow to the large bowel. This may lead to inflammation, ulceration and haemorrhage. It is more likely to occur in 'watershed' areas such as the splenic flexure that are located at the borders of the territory supplied by the superior and inferior mesenteric arteries.

Investigations

- 'thumbprinting' may be seen on abdominal x-ray due to mucosal oedema/haemorrhage

Management

- usually supportive

- surgery may be required in a minority of cases if conservative measures fail. Indications would include generalised peritonitis, perforation or ongoing haemorrhage

A 68-year-old man presents to the emergency department with sudden onset abdominal pain. He describes the pain as cramping, 6/10 in severity and all over his abdomen. He has a past medical history of hypertension and type 2 diabetes mellitus. He is an ex smoker with a 40 pack year history.

Which part of the colon is most likely to be affected in this patient?

☐ Ascending colon

☐ Hepatic flexure

☐ Transverse colon

☐ Splenic flexure

☐ Sigmoid colon

Submit answer

Which part of the colon is most likely to be affected in this patient?

Ascending colon	7%
Hepatic flexure	10%
Transverse colon	9%
Splenic flexure	67%
Sigmoid colon	7%

The splenic flexure is the most commonly affected site in ischaemic colitis

Important for me Less important

The cramping, generalised abdominal pains, in conjunction with a history of smoking and hypertension, point to a diagnosis of ischaemic colitis.

The splenic flexure is a watershed area, at the border of the regions supplied by different arteries. This makes the area vulnerable to compromised blood supply.

The rectosigmoid junction is another watershed area, but is less commonly affected than the splenic flexure.

The other regions of the large bowel are less likely to be affected by ischaemic colitis.

Discuss

Improve

Next question >

Ischaemic colitis

Ischaemic colitis describes an acute but transient compromise in the blood flow to the large bowel. This may lead to inflammation, ulceration and haemorrhage. It is more likely to occur in 'watershed' areas such as the splenic flexure that are located at the borders of the territory supplied by the superior and inferior mesenteric arteries.

Investigations

- 'thumbprinting' may be seen on abdominal x-ray due to mucosal oedema/haemorrhage

A 65-year-old woman was found to be positive for *H. pylori*, and was commenced on triple therapy eradication. Her GP wants to test if the eradication therapy has worked, as the woman is still experiencing symptoms.

Which of the following is the most appropriate for post-eradication therapy testing?

- ☐ CLO test
- ☐ Gastric biopsy
- ☐ Serum antibody
- ☐ Stool antigen
- ☐ Urea breath test

Submit answer

CLO test	11%
Gastric biopsy	7%
Serum antibody	8%
Stool antigen	12%
Urea breath test	63%

Urea breath test is the only test recommended for *H. pylori* post-eradication therapy

Important for me [Less important](#)

According to NICE, the only recommended test for *H. pylori* post-eradication therapy, is urea breath test. The others are either too invasive, remain positive, or are not sensitive and specific enough.




 Discuss

 Improve

Helicobacter pylori: tests

Urea breath test

- patients consume a drink containing carbon isotope 13 (¹³C) enriched urea
- urea is broken down by *H. pylori* urease
- after 30 mins patient exhale into a glass tube
- mass spectrometry analysis calculates the amount of ¹³C CO₂
- should not be performed within 4 weeks of treatment with an antibacterial or within 2 weeks of an antisecretory drug (e.g. a proton pump inhibitor)
- sensitivity 95-98%, specificity 97-98%
- may be used to check for *H. pylori* eradication

Rapid urease test (e.g. CLO test)

- biopsy sample is mixed with urea and pH indicator
- colour change if *H. pylori* urease activity
- sensitivity 90-95%, specificity 95-98%

Serum antibody

- remains positive after eradication
- sensitivity 85%, specificity 80%

Culture of gastric biopsy

- provide information on antibiotic sensitivity
- sensitivity 70%, specificity 100%

Gastric biopsy

- histological evaluation alone, no culture
- sensitivity 95-99%, specificity 95-99%

Stool antigen test

- sensitivity 90%, specificity 95%

A 54 year old female is admitted with a severe pneumonia following a holiday in Turkey. Bloods reveal both hyponatraemia and deranged liver function tests. A chest x-ray shows patchy alveolar infiltrates with consolidation in the right lower lobe. Which one of the following investigations is most likely to confirm the probable diagnosis?

- ☐ Sputum culture
- ☐ Urinary antigen
- ☐ Blood cultures
- ☐ Bone marrow aspirate
- ☐ Lumbar puncture

Sputum culture

8%

Urinary antigen

82%

Blood cultures

5%

Bone marrow aspirate

3%

Lumbar puncture

1%

Legionella pneumophila is best diagnosed by the **urinary antigen** test

Important for me

Less important

A 28-year-old man who has recently returned from Nigeria presents with a painful ulcer on his genitals. On examination, you note a 1cm x 1cm ulcerated lesion with a ragged border. You also note tender lymphadenopathy in the groin.

What is the most likely causative organism?

- ☐ Herpes simplex virus
- ☐ *Chlamydia trachomatis*
- ☐ *Treponema pallidum*
- ☐ *Haemophilus ducreyi*
- ☐ *Klebsiella granulomatis*

Herpes simplex virus	15%
<i>Chlamydia trachomatis</i>	17%
<i>Treponema pallidum</i>	16%
<i>Haemophilus ducreyi</i>	42%
<i>Klebsiella granulomatis</i>	10%

Chancroid causes painful genital ulcers

Important for me Less important

The painful genital ulcer with a ragged border associated with tender inguinal lymphadenopathy points to chancroid. Chancroid is caused by *Haemophilus ducreyi*.

Herpes simplex virus also causes painful genital ulcers, but they are generally smaller and multiple and primary attacks are often associated with fever.

The other organisms are causes of painless genital ulcers: *C. trachomatis* causes lymphogranuloma venereum; *T. pallidum* causes syphilis; *K. granulomatis* causes granuloma inguinale.

A 28-year-old lady is reviewed in a follow-up appointment at the sexual health clinic. Twelve months ago she was diagnosed with syphilis and was given intramuscular benzathine penicillin. Blood tests were taken a week prior to the follow-up appointment and the serology results are shown below:

TPHA	positive
VDRL	negative

What is the most likely explanation for the serology results shown above?

- ☐ She has been re-infected and has developed syphilis
- ☐ She is HIV positive
- ☐ She is pregnant
- ☐ She has been successfully treated for syphilis
- ☐ She has been suboptimally treated for syphilis

She has been re-infected and has developed syphilis	10%
She is HIV positive	9%
She is pregnant	8%
She has been successfully treated for syphilis	57%
She has been suboptimally treated for syphilis	16%

Following treatment for syphilis: TPHA remains positive, VDRL becomes negative

Important for me Less important

VDRL becomes negative following treatment of syphilis. TPHA remains positive despite successful treatment of syphilis.

Her serology is consistent with previous syphilis infection, for example after successful treatment. Therefore 4 is the correct answer.

Options 1 and 5 suggest active infection with syphilis, in which case the VDRL would be positive.

Options 2 and 3 are causes of a false-positive VDRL test, which would not explain the negative VDRL but positive TPHA in the question.

A 65-year-old diabetic male patient presents with back pain and dysuria. MRI Pelvis shows evidence of prostatitis. He has a prolonged course of antibiotics to treat his prostatitis, however, at a follow-up visit he has been shown to be colonised with MRSA (methicillin-resistant *Staphylococcus aureus*)

Which of the following antibiotics is most likely to have contributed to this?

☐ Ciprofloxacin

☐ Trimethoprim

☐ Gentamicin

☐ Tobramycin

☐ Nitrofurantoin



Ciprofloxacin promotes acquisition of MRSA

Important for me Less important

Although ciprofloxacin is not a beta-lactam antibiotic, its use is strongly linked to the acquisition of MRSA as with all quinolone antibiotics.

The other choices are unlikely to lead to MRSA infection or colonisation.

A young black African male recently moved from Zimbabwe presents with a skin lesion on his hand. On examination you note an ulceration with a black centre (eschar) with surrounding oedema, he says it is not painful.

What is an important microbe to consider?

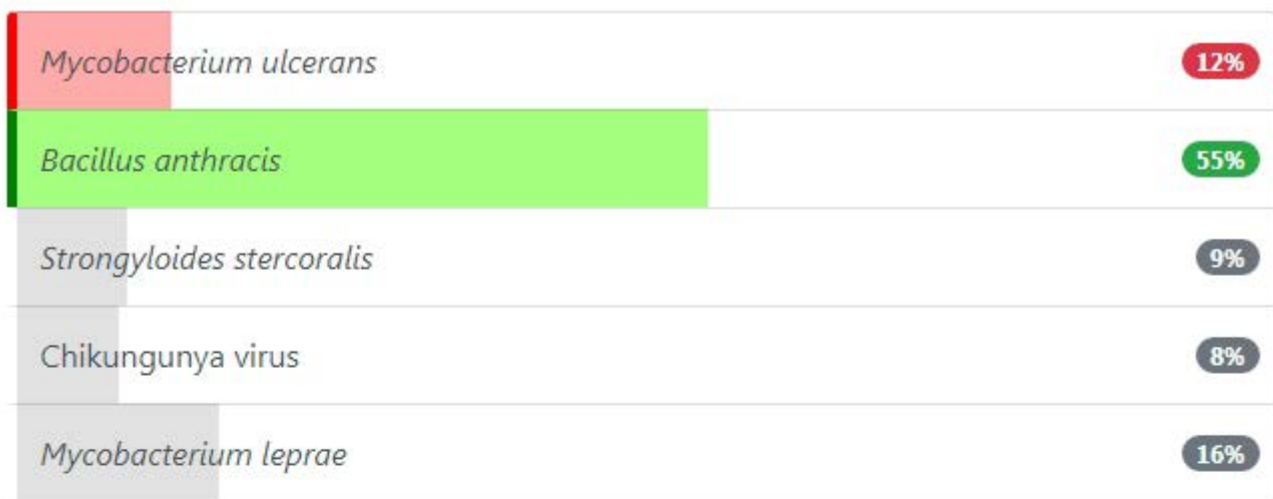
☐ *Mycobacterium ulcerans*

☐ *Bacillus anthracis*

☐ *Strongyloides stercoralis*

☐ Chikungunya virus

☐ *Mycobacterium leprae*



Painless black eschar - anthrax

Important for me Less important

Classical description of a cutaneous manifestation of anthrax, caused by *Bacillus anthracis*. Zimbabwe had the largest known outbreak of more than 10,000 cases in the late 80's (Central African Journal of Medicine, 1996)

Mycobacterium ulcerans usually presents as a painless nodule and progresses to an ulcer without an eschar.

Strongyloides stercoralis is an helminth which is contracted through contact with soil containing the larvae and most commonly in the tropics and subtropics. Usually asymptomatic and raised eosinophils may be the only indication.

Chikungunya virus is contracted through infected mosquitos. Commonly present with myalgia, arthralgia and fevers.

Mycobacterium leprae causes leprosy characterised by damages to peripheral nerves, skin and muscle.

Dr. Arsem

A 30-year-old man presents to the genito-urinary medicine clinic. He has been handed a slip from an ex-girlfriend stating she has tested positive for *Chlamydia*. He last slept with her 2 months ago. He has no symptoms of note, in particular no dysuria or discharge. What is the most appropriate management?

- ☐ Reassure symptoms would have presented by now
- ☐ Offer antibiotic therapy
- ☐ Offer *Chlamydia* testing and antibiotic treatment immediately without waiting for the results
- ☐ Offer *Chlamydia* testing and antibiotic treatment if positive
- ☐ Notify public health

Reassure symptoms would have presented by now

10%

Offer antibiotic therapy

12%

Offer *Chlamydia* testing and antibiotic treatment immediately without waiting for the results

51%

Offer *Chlamydia* testing and antibiotic treatment if positive

21%

Notify public health

7%

Treatment is given on the basis of exposure to infection rather than proven infection

A 52-year-old man with a history of alcohol dependence is admitted with fever and feeling generally unwell. An admission chest x-ray shows consolidation in the right upper lobe with early cavitation. What is the most likely causative organism?

☐ *Streptococcus pneumoniae*

☐ *Legionella pneumophila*

☐ *Staphylococcus aureus*

☐ *Klebsiella pneumoniae*

☐ *Mycoplasma pneumoniae*

Streptococcus pneumoniae

5%

Legionella pneumophila

5%

Staphylococcus aureus

11%

Klebsiella pneumoniae

73%

Mycoplasma pneumoniae

7%

Pneumonia in an alcoholic - *Klebsiella*

Important for me Less important

A 35-year-old male patient presents to the emergency department with fever and hypotension. He had returned 2 days previously from a business trip from India, which lasted 3 weeks. The patient had not sought any pre-travel advice and had not taken any malaria prophylaxis.

The patient was pale and looked lethargic. His temperature was 38.5°C, oxygen saturations were 92% on air, blood pressure was 80/60 mmHg and heart rate was 135/min at initial presentation.

A malaria rapid diagnostic kit had revealed a probable falciparum malaria.

Which of the following options is most appropriate?

- ☐ Oral quinine
- ☐ IV quinine
- ☐ IV artesunate
- ☐ Doxycycline
- ☐ Clindamycin

Oral quinine	7%
IV quinine	14%
IV artesunate	70%
Doxycycline	5%
Clindamycin	4%

Quinine is no longer recommended as a first-line treatment for complicated/severe falciparum malaria

Important for me Less important

Whilst all the above options are potential antimalarial treatments, according to the UK malaria treatment guidelines 2016 (Journal of Infection) IV artesunate is the first line treatment where available for complicated or severe malaria.

The patient is shocked and this therefore suggests complicated malaria.

Several trials have demonstrated benefit of IV artesunate over IV quinine for complicated falciparum malaria.

A 24-year-old man with no past medical history is diagnosed with syphilis and the treatment is administered.

An hour later he starts to develop a rash and you are called to review him.

His heart rate is 120 beats per minute and his blood pressure is 96/62 mmHg. On auscultation of his chest, you notice a wheeze throughout.

What is the most appropriate initial management?

- ☐ Give oral chlorphenamine
- ☐ Give an intravenous fluid bolus
- ☐ Reassure and discharge
- ☐ Give intramuscular adrenaline
- ☐ Monitor his observations every 30 minutes

Give oral chlorphenamine	10%
Give an intravenous fluid bolus	13%
Reassure and discharge	17%
Give intramuscular adrenaline	50%
Monitor his observations every 30 minutes	10%

The Jarisch-Herxheimer reaction, unlike an anaphylactic reaction, will not present with hypotension and wheeze

Important for me Less important

The scenario is describing an anaphylactic reaction following the treatment for syphilis, probably due to an unknown penicillin allergy. He, therefore, requires treatment with intramuscular adrenaline in the first instance. The other options are therefore incorrect.

It is important to distinguish anaphylactic reactions from the Jarisch-Herxheimer reaction, which can result in fever, tachycardia and rash following syphilis treatment. A Jarisch-Herxheimer reaction would not cause a wheeze and is unlikely to cause hypotension.

Dr. A. S. S. S.

A 28-year-old man who has recently emigrated from Nigeria presents with a penile ulcer. It initially started as a papule which later progressed to become a painful ulcer with an undermined ragged edge. Examination of the testes was unremarkable but tender inguinal lymphadenopathy was noted. What is the most likely diagnosis?

- ☐ Chancroid
- ☐ Lymphogranuloma venereum
- ☐ Syphilis
- ☐ Herpes simplex infection
- ☐ Granuloma inguinale

Chancroid	53%
Lymphogranuloma venereum	25%
Syphilis	6%
Herpes simplex infection	6%
Granuloma inguinale	9%

Genital ulcers

- painful: herpes much more common than chancroid
- painless: syphilis more common than lymphogranuloma venereum

Important for me Less important

A diagnosis of chancroid is more likely than lymphogranuloma venereum as the ulcer is painful. Whilst herpes simplex is obviously more common the description of the ulcer is very characteristic of chancroid. Painful inguinal lymphadenopathy is present in around 50% of patients.

A 29-year-old HIV positive man is admitted with right-sided hemiplegia. For the past four days he has been complaining of headache and flu-like symptoms. CT scan shows multiple ring enhancing lesions. A diagnosis of cerebral toxoplasmosis is suspected. What is the most suitable management?

- ☐ Artemether and lumefantrine
- ☐ Co-trimoxazole
- ☐ Supportive treatment
- ☐ Pyrimethamine and sulphadiazine
- ☐ Metronidazole and gentamicin

A 29-year-old HIV positive man is admitted with right-sided hemiplegia. For the past four days he has been complaining of headache and flu-like symptoms. CT scan shows multiple ring enhancing lesions. A diagnosis of cerebral toxoplasmosis is suspected. What is the most suitable management?

Artemether and lumefantrine

8%

Co-trimoxazole

18%

Supportive treatment

8%

Pyrimethamine and sulphadiazine

57%

Metronidazole and gentamicin

9%

A 35-year-old male patient presents to the emergency department with fever. He had returned 2 days previously from India on a business trip which lasted 3 weeks. The patient had not sought any pre-travel advice and had not taken any malaria prophylaxis.

A malaria rapid diagnostic kit had revealed non-falciparum parasites. The patient received initial treatment for *P. vivax* malaria and was subsequently discharged.

Which of the following is the most important next step in management?

- ☐ G6PD deficiency testing prior to administration of primaquine
- ☐ Lifelong quinine for malaria prophylaxis
- ☐ Mefloquine for 6 weeks
- ☐ No further treatment necessary
- ☐ Regular blood films to look for persistent parasitaemia

G6PD deficiency testing prior to administration of primaquine

39%

Lifelong quinine for malaria prophylaxis

5%

Mefloquine for 6 weeks

24%

No further treatment necessary

17%

Regular blood films to look for persistent parasitaemia

15%

Hypnozoite eradication is important to prevent relapsed *P. vivax* and *P. ovale* malaria

Important for me Less important

It is important to note that hypnozoites may persist in the liver with non-falciparum malaria, even after treatment. This could lead to relapsed malaria months or even years later.

Primaquine is an important drug which can be used for eradication of hypnozoites.

Primaquine should not be given to people with glucose-6- phosphate dehydrogenase (G6PD) deficiency due to the risk of haemolysis.

Dr Assem

A 25-year-old female primary school teacher presents to the emergency department with a rash and fever. She states that there have been a number of cases of slap cheek (parvovirus B19) infection at the school.

Of the choices given, what is the most important consideration?

- ☐ Skin swab
- ☐ Arterial blood gas
- ☐ Pregnancy test
- ☐ Stool culture
- ☐ Sputum culture

Skin swab

11%

Arterial blood gas

6%

Pregnancy test

69%

Stool culture

6%

Sputum culture

8%

Parvovirus is a common cause of fetal hydrops during pregnancy and can be treated with fetal transfusion

Important for me [Less important](#)

'Erythema infectiosum', 'fifth disease' and 'slap cheek' are the same condition which are all possible manifestations of parvovirus B19 infection. It is associated with fetal abnormalities and commonly causes a characteristic rash in children and in adults it can additionally cause arthralgia.

Infection in a pregnant woman can lead to fetal hydrops and spontaneous miscarriage, particularly in the first trimester. This can be managed with the use of fetal blood transfusion.

In patients with sick-cell disease, aplastic crisis may be precipitated by parvovirus. Immunocompromised individuals are also at risk.

A 73-year-old man presents with worsening cellulitis. The nurse takes his observations which are the following a respiratory rate of 28/min, heart rate 110/min, blood pressure 100/70 mmHg and a temperature of 39.5°C. Blood cultures are taken and later reported as growing a gram positive, catalase and coagulase positive cocci.

Which is the most likely organism?

- ☐ *Streptococcus pyogenes*
- ☐ *Streptococcus viridans*
- ☐ *Staphylococcus aureus*
- ☐ *Clostridium difficile*
- ☐ *Staphylococcus epidermidis*

Streptococcus pyogenes

17%

Streptococcus viridans

7%

Staphylococcus aureus

59%

Clostridium difficile

5%

Staphylococcus epidermidis

12%

Staphylococcus aureus is a gram +ve bacterium, catalase +ve, coagulase +ve organism

Important for me Less important

Answers 1, 2, 3, 5 are all gram positive cocci, 4 is a rod and so incorrect. *Streptococcus viridans* and *Streptococcus pyogenes* are both catalase negative. *Staphylococcus epidermidis* is catalase positive but coagulase negative.

This therefore leaves *Staphylococcus aureus* as the answer.

Dr Assem

A 64-year-old man is admitted to the emergency department as his wife is concerned that he is becoming confused following a recent bad chest infection. She reports that he has not improved after a course of amoxicillin.

On examination, his respiratory rate is 30/min, blood pressure 88/60 mmHg, heart rate 120/min. Crackles are noted on the right side of his chest.

What is the most appropriate fluid therapy to give?

- ☐ 20 ml/kg stat
- ☐ 30 ml/kg stat
- ☐ 500ml stat
- ☐ 20 ml/kg over 1 hour
- ☐ 10 ml/kg over 1 hour

20 ml/kg stat	11%
30 ml/kg stat	12%
500ml stat	53%
20 ml/kg over 1 hour	14%
10 ml/kg over 1 hour	11%

This patient has a number of features of red flag sepsis, including the confusion, low blood pressure and raised respiratory rate. The sepsis 6 should be started.

In the NICE guidelines on sepsis the following recommendations are made with regards to fluid resuscitation:

If patients over 16 years need intravenous fluid resuscitation, use crystalloids that contain sodium in the range 130–154 mmol/litre with a bolus of 500 ml over less than 15 minutes.

A 25-year-old male patient is admitted to the emergency department following an assault in prison. On examination, the patient has suffered a bite which has broken the skin. Hepatitis B surface antibody is shown to be more than 100 mIU/ml and he admits to previous vaccination against hepatitis B.

Which of the following is the most appropriate next step in management?

- ☐ Hepatitis B immunoglobulin
- ☐ Antiretrovirals for post-exposure prophylaxis for HIV
- ☐ Antibiotics and tetanus booster
- ☐ Hepatitis B vaccination
- ☐ Hepatitis C vaccination

Hepatitis B immunoglobulin	20%
Antiretrovirals for post-exposure prophylaxis for HIV	9%
Antibiotics and tetanus booster	53%
Hepatitis B vaccination	14%
Hepatitis C vaccination	4%

Post-exposure prophylaxis for HIV is not recommended following human bites

Important for me Less important

The hepatitis B surface antibody levels suggest adequate immunity and therefore negates the need for further hepatitis B vaccination or hepatitis B immunoglobulin.

Post-exposure prophylaxis for HIV is not recommended following human bites. Estimated risk of HIV transmission from a bite from a known HIV-positive individual not on anti-retroviral treatment is <1 in 10,000. (BASHH guidelines, UK guideline for the use of HIV Post-Exposure Prophylaxis Following Sexual Exposure, 2015)

There is no current hepatitis C vaccination.

A 22-year-old female presents with an offensive vaginal discharge. History and examination findings are consistent with a diagnosis of bacterial vaginosis. What is the most appropriate initial management?

- ☐ Oral azithromycin
- ☐ Topical hydrocortisone
- ☐ Oral metronidazole
- ☐ Clotrimazole pessary
- ☐ Advice regarding hygiene and cotton underwear

Oral azithromycin

12%

Topical hydrocortisone

4%

Oral metronidazole

66%

Clotrimazole pessary

7%

Advice regarding hygiene and cotton underwear

11%

Bacterial vaginosis: oral metronidazole

Important for me

Less important

An 18-year-old male student presents to the emergency department with fever, headache and photophobia. On examination, he is pyrexial at 39°C and has observable neck stiffness. There is no evidence of rash and other than a recent ear infection, there is no other relevant past medical history.

Which of the following is the most appropriate intravenous treatment option?

- ☐ Benzylpenicillin
- ☐ Ceftriaxone
- ☐ Ceftriaxone and dexamethasone
- ☐ Cefalexin
- ☐ Amoxicillin

Benzympenicillin	12%
Ceftriaxone	33%
Ceftriaxone and dexamethasone	45%
Cefalexin	5%
Amoxicillin	4%

Dexamethasone improves outcomes in the treatment of bacterial meningitis

Important for me Less important

The clinical picture is of possible bacterial meningitis. In this context ceftriaxone is clearly the correct antibiotic choice. It is important to note the use of dexamethasone when treating potential meningitis. Dexamethasone has been shown to improve outcomes with particular relevance to pneumococcal meningitis. It has shown in particular to prevent long-term hearing loss.

Until the cause of the meningitis is known then dexamethasone should be initiated. The recent ear infection is a risk factor for pneumococcal meningitis.

See British Infection Association guidelines on management of meningitis for further information.

A 28-year-old man from Zimbabwe presents to the emergency department with a 2 week history of fever, cough, headache, vomiting and neck stiffness. He is known to be HIV positive and is on treatment. His most recent CD4 count was 450 cells/mm³

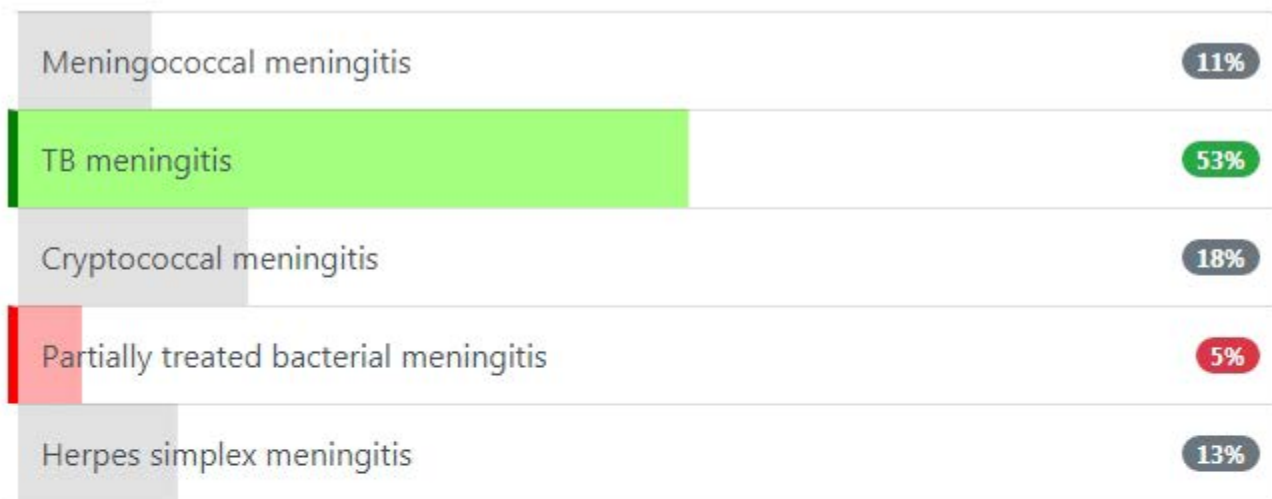
On examination he has no focal neurological signs but appears drowsy and confused. You suspect meningitis and perform a lumbar puncture

The results show:

Opening pressure	25mm H ₂ O
Appearance	cloudy
White cells	200 cells/mm ³
Cells	90% lymphocytes
CSF protein	3 g/L
CSF glucose	1.1 mmol/L
Blood glucose	6.8 mm/L

What is the most likely diagnosis?

- ☐ Meningococcal meningitis
- ☐ TB meningitis
- ☐ Cryptococcal meningitis
- ☐ Partially treated bacterial meningitis
- ☐ Herpes simplex meningitis



The lymphocytic CSF with high protein and low glucose in this case could be due to both cryptococcal and TB meningitis, however the insidious onset of symptoms, very high protein and low glucose compared to the plasma glucose ($<1/3$ of plasma) points more towards TB meningitis. Also this man has a relatively high CD4 count and only a mildly raised opening pressure which makes cryptococcal meningitis more unlikely. TB and HIV co-infection are common, especially in sub-Saharan Africa and should always be considered.

Which one of the following is the most common cause of visceral larva migrans?

- ☐ *Cryptococcus neoformans*
- ☐ *Strongyloides stercoralis*
- ☐ Visceral leishmaniasis
- ☐ *Toxocara canis*
- ☐ Giardiasis

Cryptococcus neoformans

9%

Strongyloides stercoralis

28%

Visceral leishmaniasis

24%

Toxocara canis

30%

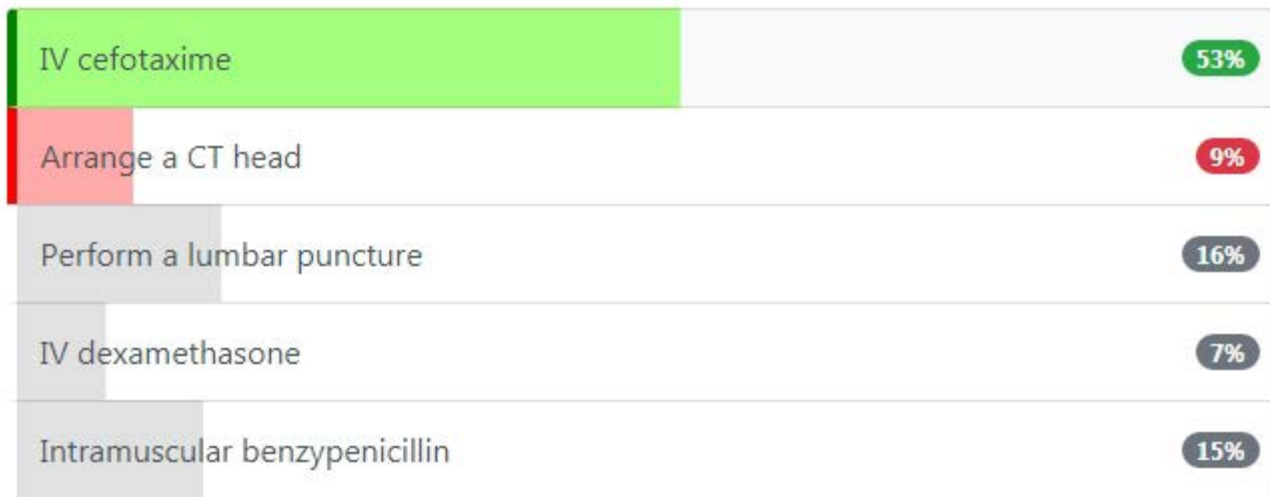
Giardiasis

9%

Dr. Arsem

A 31-year-old woman presents to the Emergency Department complaining of a headache. She has had 'flu' like symptoms for the past three days with the headache developing gradually yesterday. The headache is described as being 'all over' and is worse on looking at bright light or when bending her neck. On examination her temperature is 38.2°, pulse 96 / min and blood pressure 116/78 mmHg. There is neck stiffness present but no focal neurological signs. On close inspection you notice a number of petechiae on her torso. She has been cannulated and bloods (including cultures) have been taken. What is the most appropriate next step?

- ☐ IV cefotaxime
- ☐ Arrange a CT head
- ☐ Perform a lumbar puncture
- ☐ IV dexamethasone
- ☐ Intramuscular benzylpenicillin



This patient has meningococcal meningitis. They need appropriate intravenous antibiotics immediately. With the advent of modern PCR diagnostic techniques there is no justification for delaying potentially lifesaving treatment by performing a lumbar puncture in patients with suspected meningococcal meningitis.

A 24-year-old woman who is 18 weeks pregnant presents to the Emergency Department. Earlier on in the morning she came into contact with a child who has chickenpox. She is unsure if she had the condition herself as a child. What is the most appropriate action?

- ☐ Advise her to present within 24 hours of the rash developing for consideration of IV aciclovir
- ☐ Reassure her that there is no risk of fetal complications at this point in pregnancy
- ☐ Give varicella immunoglobulin
- ☐ Check varicella antibodies
- ☐ Prescribe oral aciclovir

Advise her to present within 24 hours of the rash developing for consideration of IV aciclovir

5%

Reassure her that there is no risk of fetal complications at this point in pregnancy

7%

Give varicella immunoglobulin

43%

Check varicella antibodies

41%

Prescribe oral aciclovir

5%

Chickenpox exposure in pregnancy - first step is to check antibodies

Important for me Less important

If there is any doubt about the mother previously having chickenpox maternal blood should be checked for varicella antibodies

Dr Assem

A 35-year-old man is reviewed in clinic having been diagnosed with HIV two years ago and is stable on anti-retroviral therapy. He has a new regular partner and is concerned about transmitting the disease to him. What factor is most likely to increase the risk of transmission?

- ☐ Circumcision
- ☐ Low CD4 count
- ☐ Co-infection with genital warts
- ☐ Diabetes
- ☐ Mucosal ulceration



The correct answer is mucosal ulceration. Ulceration limits barrier protection to HIV infection. A low CD4 count is not associated with increased transmission rate, but an increased HIV viral load. Genito-urinary infection can increase transmission rates but genital warts has not been shown to do so. Diabetes would increase the rates of bacterial and fungal infections but not viral ones. Circumcision is protective to HIV transmission.

Source:

'UK Guideline for the Use of HIV Post-Exposure Prophylaxis Following Sexual Exposure (PEPSE) 2015.' BASHH. N.p., 2015.

Dr Assem

An 18-year-old man is bitten by a frantic dog whilst taking a gap year in Ecuador. He is worried about rabies and phones for advice. He was not immunised against prior to travelling to Ecuador. What is the most appropriate advice after thorough cleansing of the wound?

- ☐ Give human rabies immunoglobulin + full course of vaccination
- ☐ Give human rabies immunoglobulin + oral penicillin for the next 2 weeks
- ☐ Advise low risk but take oral co-amoxiclav for the dog bite
- ☐ Give human rabies immunoglobulin
- ☐ Give full course of vaccination

Give human rabies immunoglobulin + full course of vaccination

56%

Give human rabies immunoglobulin + oral penicillin for the next 2 weeks

17%

Advise low risk but take oral co-amoxiclav for the dog bite

8%

Give human rabies immunoglobulin

10%

Give full course of vaccination

8%

Rabies - following possible exposure give immunoglobulin + vaccination

Important for me

Less important

A 64-year-old woman presents to the Emergency Department with a cough, fever, diarrhoea and myalgia. The cough is non-productive and has been getting gradually worse since she returned from holiday in Spain one week ago. Her husband is concerned because over the past 24 hours she has become more drowsy and febrile. He initially thought she had the 'flu but her symptoms have got progressively worse. She is normally fit and well but drinks around 20 units of alcohol per week.

On examination pulse is 76/min, blood pressure 104/62 mmHg, oxygen saturations are 94% on room air and temperature is 38.4°C. Bilateral coarse crackles are heard in the chest.

Initial blood tests show the following:

Hb	13.6 g/dl
Platelets	311 * 10 ⁹ /l
WBC	14.2 * 10 ⁹ /l
Na ⁺	131 mmol/l
K ⁺	4.3 mmol/l
Urea	9.2 mmol/l
Creatinine	91 µmol/l
Bilirubin	12 µmol/l
ALP	31 u/l
ALT	64 u/l

A chest x-ray shows patchy consolidation in the left lower zone with an associated pleural effusion.

What is the most likely causative organism?

- ☐ *Streptococcus pneumoniae*
- ☐ *Mycoplasma pneumoniae*
- ☐ *Legionella pneumophila*
- ☐ *Klebsiella pneumoniae*
- ☐ *Staphylococcus aureus*

<i>Streptococcus pneumoniae</i>	8%
<i>Mycoplasma pneumoniae</i>	9%
<i>Legionella pneumophila</i>	52%
<i>Klebsiella pneumoniae</i>	22%
<i>Staphylococcus aureus</i>	9%

Stereotypical features of *Legionella* include flu-like symptoms and a dry cough, relative bradycardia and confusion. Blood tests may show hyponatraemia

Important for me Less important

There are a number of features here which strongly suggest *Legionella*:

- recent foreign travel
- flu-like symptoms
- hyponatraemia
- pleural effusion

Which one of the following is true regarding linezolid?

- ☐ Active against both MRSA and VRE (Vancomycin-Resistant Enterococcus)
- ☐ Bactericidal in action
- ☐ No activity against GISA (Glycopeptide Intermediate *Staphylococcus aureus*)
- ☐ Adverse effects include raised platelet count
- ☐ Inhibits RNA synthesis

Active against both MRSA and VRE (Vancomycin-Resistant Enterococcus)

57%

Bactericidal in action

16%

No activity against GISA (Glycopeptide Intermediate *Staphylococcus aureus*)

8%

Adverse effects include raised platelet count

6%

Inhibits RNA synthesis

13%

A 34-year-old man presents with a widespread maculopapular rash and mouth ulcers. Two months ago he presented to the local GUM clinic after developing a painless penile ulcer. At the time he was noted to have inguinal lymphadenopathy. Which one of the following organisms is most likely to be responsible?

☐ Lymphogranuloma venereum

☐ Herpes simplex virus type 2

☐ *Mycoplasma genitalium*

☐ *Haemophilus ducreyi*

☐ *Treponema pallidum*



This patient has symptoms of secondary syphilis.

A 28-year-old nurse on your ward receives a needle stick injury after taking blood from a known HIV positive patient. You give her first aid treatment and send bloods for an initial HIV test. She asks you about post exposure prophylaxis.

What would you advise?

- ☐ Tenofovir, repeat HIV test in 12 weeks
- ☐ Combination antiretrovirals (Tenofovir, emtricitabine and lopinavir/ritonavir) repeat HIV test in 4 weeks
- ☐ Nevirapine, repeat HIV test in 4 weeks
- ☐ Combination antiretrovirals (Tenofovir, emtricitabine and lopinavir/ritonavir), repeat HIV test in 12 week
- ☐ Tenofovir, repeat HIV test in 4 weeks

Tenofovir, repeat HIV test in 12 weeks

7%

Combination antiretrovirals (Tenofovir, emtricitabine and lopinavir/ritonavir)
repeat HIV test in 4 weeks

39%

Nevirapine, repeat HIV test in 4 weeks

6%

Combination antiretrovirals (Tenofovir, emtricitabine and lopinavir/ritonavir),
repeat HIV test in 12 weeks

41%

Tenofovir, repeat HIV test in 4 weeks

7%

Combination antiretrovirals should be given rather than single therapy as it is more effective and it helps prevent development of resistance. Nevirapine can be used in post exposure prophylaxis in new born babies born to HIV positive mothers.

Repeat testing for HIV antibody/antigen should be done at 12 weeks as this is how long it can take to develop antibodies.

Source: British HIV association - UK guideline for the use of post-exposure prophylaxis for HIV following sexual exposure (2011)

A 31-year-old man who is known to be HIV positive presents with dyspnoea and a dry cough. He is currently homeless and has not been attending his outpatient appointments or taking antiretroviral medication.

Clinical examination reveals a respiratory rate of 24 / min. Chest auscultation is unremarkable with only scattered crackles. His oxygen saturation is 96% on room air but this falls rapidly after walking the length of the ward. Given the likely diagnosis, what is the most appropriate first-line treatment?

- ☐ Fluconazole
- ☐ Co-trimoxazole
- ☐ Erythromycin
- ☐ Ganciclovir
- ☐ Sulfadiazine and pyrimethamine

Fluconazole

7%

Co-trimoxazole

69%

Erythromycin

7%

Ganciclovir

4%

Sulfadiazine and pyrimethamine

13%

A 25-year-old woman has recently moved to the United Kingdom from sub-Saharan Africa to attend University. She comes from an area where there is a high prevalence of tuberculosis (TB). The patient is not pregnant and is currently asymptomatic. She thinks she may have had a BCG vaccination in the past but is not sure. She has no other medical history and is a non-smoker. A chest x-ray is normal. She has a Mantoux test which is positive and subsequently an interferon-gamma release assay which is also positive.

What is the best management option for this patient?

- ☐ Isoniazid and pyridoxine for 6 months
- ☐ No treatment indicated at present
- ☐ Rifampicin and isoniazid with pyridoxine for 6 months
- ☐ Arrange a bronchoscopy and lavage
- ☐ Rifampicin, isoniazid, pyrazinamide and ethambutol for 6 months

Isoniazid and pyridoxine for 6 months

38%

No treatment indicated at present

13%

Rifampicin and isoniazid with pyridoxine for 6 months

23%

Arrange a bronchoscopy and lavage

5%

Rifampicin, isoniazid, pyrazinamide and ethambutol for 6 months

21%

The 2016 NICE guidelines on Tuberculosis (TB) advice that if a Mantoux test is positive (>5mm) then the patient should be screened for active TB. If there is no evidence of active TB and an interferon-gamma release assay is positive then you should consider treatment for latent TB. The two options are:

- 3 months of isoniazid with pyridoxine and rifampicin
- 6 months of isoniazid with pyridoxine

The other drug combinations are incorrect and not recommended by NICE. We have been given the diagnosis of latent TB with the Mantoux test and interferon-gamma release assay and therefore a bronchoscopy and lavage are not required.

You are counselling a 26-year-old man who has recently had a positive HIV test. His most recent CD4 count is 650 cells/mm³. Which one of the following vaccinations is contraindicated?

- ☐ Oral poliomyelitis
- ☐ Yellow fever
- ☐ Pneumococcus
- ☐ Parenteral poliomyelitis
- ☐ Measles, Mumps, Rubella

Oral poliomyelitis

31%

Yellow fever

34%

Pneumococcus

7%

Parenteral poliomyelitis

10%

Measles, Mumps, Rubella

17%

A patient with HIV is reviewed. Which one of the following is an example of a nucleoside analogue reverse transcriptase inhibitors?

☐ Zidovudine

☐ Indinavir

☐ Ritonavir

☐ Ribavirin

☐ Efavirenz



HIV drugs, rule of thumb:

- NRTIs end in 'ine'
- Pis: end in 'vir'
- NNRTIs: nevirapine, efavirenz

Important for me Less important

Zidovudine (AZT) was one of the first HIV drugs and remains important today.

A 20-year-old student presents complaining of multiple painful ulcers on the shaft of his penis. He tells you he has had a new sexual partner recently but she has not reported any symptoms. He feels generally unwell and had tender enlarged inguinal lymph nodes bilaterally. He denies urethral discharge or dysuria.

What is the most likely diagnosis?

- ☐ Behcets syndrome
- ☐ Herpes simplex
- ☐ Syphilis
- ☐ Lymphogranuloma venereum
- ☐ Donovanosis

Behcets syndrome

6%

Herpes simplex

49%

Syphilis

8%

Lymphogranuloma venereum

32%

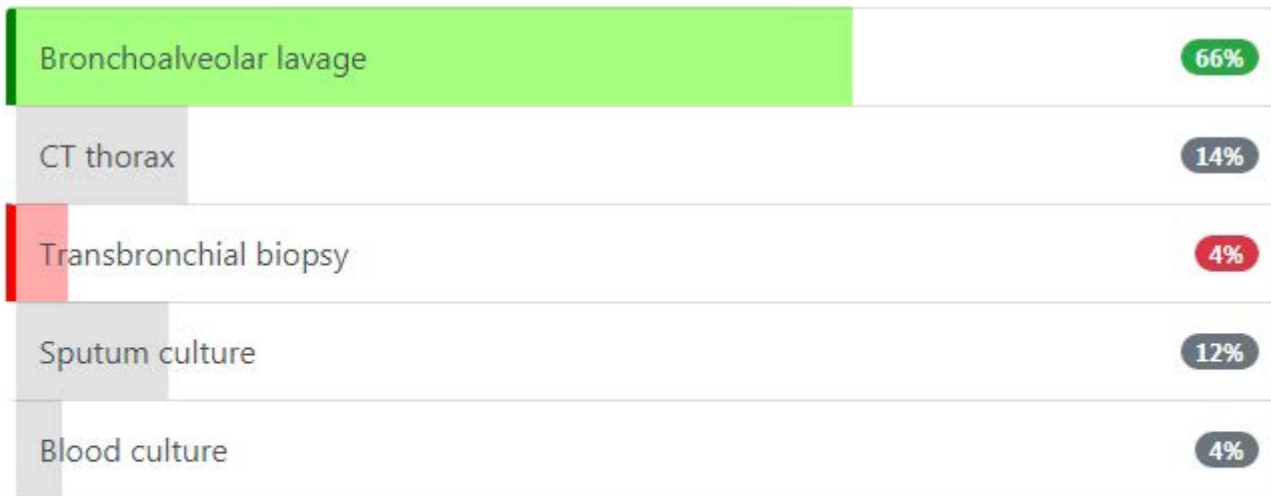
Donovanosis

6%

Syphilis, Lymphogranuloma venereum (LGV) and donovanosis (granuloma inguinal) all cause painless genital ulcers. Behcets may cause painful genital ulcers but herpes simplex is more likely given the recent change in sexual partner and the lack of other symptoms.

A 29-year-old man with HIV is admitted with shortness of breath. He has recently emigrated from South Africa and has only just started taking anti-retroviral medication. Auscultation of his chest is unremarkable although chest x-ray shows bilateral pulmonary interstitial shadowing. What is the investigation of choice?

- ☐ Bronchoalveolar lavage
- ☐ CT thorax
- ☐ Transbronchial biopsy
- ☐ Sputum culture
- ☐ Blood culture



This man likely has *Pneumocystis carinii* pneumonia. Definitive diagnosis is by bronchial alveolar lavage with silver staining

A 25-year-old woman is admitted to a local hospital whilst travelling in north India. She is 26 weeks pregnant with her first child and the pregnancy has been uneventful to date. For the past 3-4 days she has been feeling generally unwell with fever, lethargy and vomiting. She takes no regular medication other than malaria prophylaxis (chloroquine).

On examination her pulse is 96/min, blood pressure 102/66 mmHg. Jaundiced sclera, along with some bruising on her arms is noted. Her partner states that she also seems confused.

Bloods show the following:

Bilirubin	102 $\mu\text{mol/l}$
ALP	256 u/l
ALT	1024 u/l
γGT	563 u/l
Albumin	35 g/l
INR	2.4

What is the most likely cause of her deterioration?

- ☐ Hepatitis A
- ☐ Hepatitis B
- ☐ Hepatitis E
- ☐ Malaria
- ☐ Amoebiasis



Severe hepatitis in a pregnant woman - think hepatitis E

Important for me Less important

This lady has developed fulminant hepatitis, or acute liver failure. This is uncommon with the hepatitis viruses but pregnant women are at particular risk from hepatitis E infection. As women approach their third trimester (slightly later than the scenario here) the mortality rate approaches 20%.

A 17-year-old girl presents with a sore throat. On examination she has inflamed tonsils covered in white patches. Tender cervical lymphadenopathy and a low grade pyrexia are also present. Which one of the following organisms is most likely to be responsible?

- ☐ *Streptococcus viridans*
- ☐ *Streptococcus agalactiae*
- ☐ *Streptococcus pneumoniae*
- ☐ *Staphylococcus aureus*
- ☐ *Streptococcus pyogenes*

Streptococcus viridans

11%

Streptococcus agalactiae

7%

Streptococcus pneumoniae

14%

Staphylococcus aureus

9%

Streptococcus pyogenes

59%

A previously well 68-year-old woman is reviewed on the acute medical ward. She has recently been commenced on methotrexate for newly diagnosed rheumatoid arthritis. During your review, she complains of dysuria and urinary frequency. She is otherwise systemically well, with no fever or loin tenderness.

Urinalysis results show:

Leucocytes	+++
Nitrites	Positive
Blood	Trace

Which antibiotics should be used to treat this patient's urinary tract infection?

☐ Amoxicillin + Gentamicin

☐ Trimethoprim

☐ Ciprofloxacin

☐ Co-trimoxazole

☐ Nitrofurantoin



Trimethoprim and Co-trimoxazole should be avoided in patients on Methotrexate

Important for me Less important

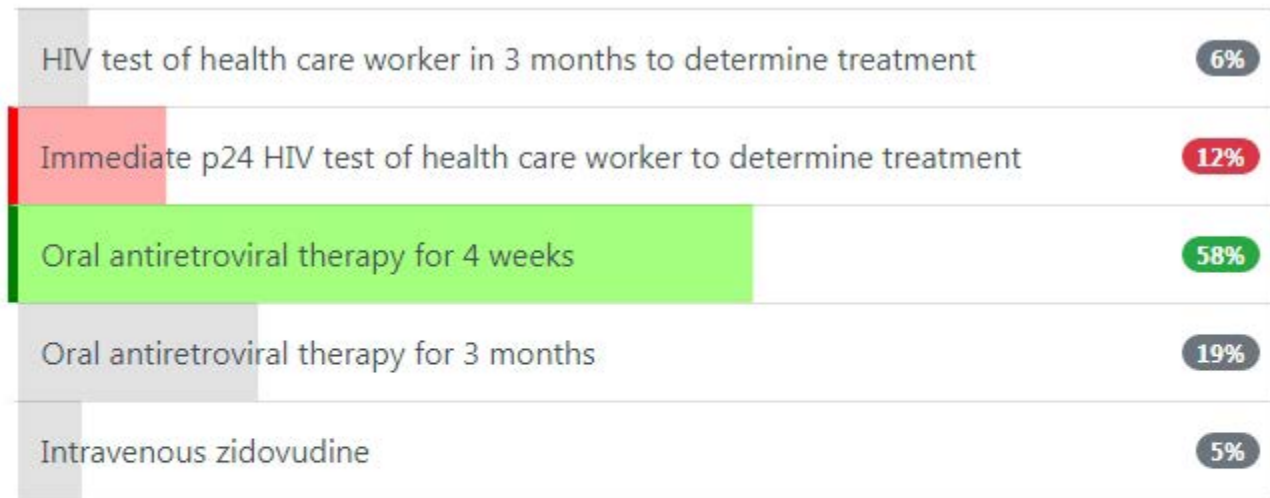
Both trimethoprim and methotrexate work by inhibiting the enzyme dihydrofolate reductase. When given alongside one another, patients can develop life-threatening myelosuppression due to the cumulative effect of the folic acid antagonism that occurs.

Since co-trimoxazole is a combination of trimethoprim and sulfamethoxazole, this effect occurs with the co-prescription of co-trimoxazole and methotrexate also.

Amoxicillin and gentamicin is usually given in the treatment of pyelonephritis/urosepsis, and would be inappropriate in this patient. Ciprofloxacin is also more commonly used in complicated urinary tract infections and would not commonly be first line.

A health care assistant sustains a needlestick injury whilst taking blood from a patient who is known to be HIV positive. Following thorough washing of the wound what is the most appropriate management?

- ☐ HIV test of health care worker in 3 months to determine treatment
- ☐ Immediate p24 HIV test of health care worker to determine treatment
- ☐ Oral antiretroviral therapy for 4 weeks
- ☐ Oral antiretroviral therapy for 3 months
- ☐ Intravenous zidovudine



Post-exposure prophylaxis for HIV: oral antiretroviral therapy for 4 weeks

Important for me Less important

A 75-year-old woman is admitted with confusion to the Emergency Department. Her urine dipstick is positive for nitrites and leucocytes and a diagnosis of urinary tract infection is suspected. She is therefore prescribed a 7 day course of trimethoprim. Bloods taken in the Emergency Department are as follows:

Na ⁺	141 mmol/l
K ⁺	3.7 mmol/l
Urea	4.3 mmol/l
Creatinine	78 µmol/l
CRP	21 mg/l

Five days later on the ward her bloods are repeated:

Na ⁺	140 mmol/l
K ⁺	3.9 mmol/l
Urea	5.3 mmol/l
Creatinine	125 µmol/l
CRP	6 mg/l

What is the most likely explanation for the change in renal function?

- ☐ Impaired renal function secondary to acute pyelonephritis
- ☐ Crystal-induced nephropathy secondary to trimethoprim
- ☐ Trimethoprim competitively inhibiting the tubular secretion of creatinine
- ☐ Interstitial nephritis secondary to trimethoprim
- ☐ Spurious result due to plasma-bound trimethoprim being confused with creatinine

Impaired renal function secondary to acute pyelonephritis

6%

Crystal-induced nephropathy secondary to trimethoprim

12%

Trimethoprim competitively inhibiting the tubular secretion of creatinine

47%

Interstitial nephritis secondary to trimethoprim

24%

Spurious result due to plasma-bound trimethoprim being confused with creatinine

11%

The fall in CRP is not consistent with the development of acute pyelonephritis.

A 33-year-old man is admitted due to profuse diarrhoea. He has a history of HIV infection and *Cryptosporidium* diarrhoea is suspected. What investigation is most likely to confirm the diagnosis?

- ☐ Blood cultures
- ☐ Sigmoidoscopy with biopsy
- ☐ Abdominal x-ray
- ☐ Acid-fast staining of stool sample
- ☐ *Cryptosporidium* PCR of stool sample

Blood cultures

4%

Sigmoidoscopy with biopsy

6%

Abdominal x-ray

4%

Acid-fast staining of stool sample

37%

Cryptosporidium PCR of stool sample

49%

Cryptosporidium cysts turn red following acid-fast staining. Molecular methods are currently used mainly as a research tool

Dr Assem

A 53-year-old woman is diagnosed with left leg cellulitis. A swab is taken and oral flucloxacillin is started. The following result is obtained:

Skin swab:

Group A *Streptococcus*

How should the antibiotic therapy be changed?

- ☐ No change
- ☐ Add topical fusidic acid
- ☐ Add clindamycin
- ☐ Switch to phenoxymethylpenicillin
- ☐ Add erythromycin



Penicillin is the antibiotic of choice for group A streptococcal infections. The BNF suggests stopping flucloxacillin if streptococcal infection is confirmed in patients with cellulitis, due to the high sensitivity. This should be balanced however with the variable absorption of phenoxymethylpenicillin.

A 30-year-old man returns from a cheese and wine tasting holiday in Portugal. On questioning, he tells you about all the unpasteurised cheese he tried. He comes to the GP complaining of feeling very unwell. On questioning, he reports having fluctuating temperatures, he has pain in his joints and muscles that is transient and has noticed a peculiar 'wet hay' smell when he sweats, which is a lot. What is the most likely causative organism?

☐ *Yersinia pestis*

☐ *Brucella melitensis*

☐ *Wuchereria bancrofti*

☐ *Bartonella henselae*

☐ *Plasmodium falciparum*

<i>Yersinia pestis</i>	23%
<i>Brucella melitensis</i>	53%
<i>Wuchereria bancrofti</i>	10%
<i>Bartonella henselae</i>	10%
<i>Plasmodium falciparum</i>	4%

This patient is presenting with symptoms typical of Brucellosis; Fluctuating temperatures, transient arthralgia and myalgia, hyperhidrosis with a 'wet hay' smell. The clue in the history is his exposure to unpasteurised cheese.

Brucella melitensis is the bacteria found in contaminated unpasteurised milk that causes brucellosis.

Bartonella henselae, the causative agent of cat scratch disease, would present with a history of exposure to cat scratches.

Yersinia pestis, the causative agent of bubonic plague, would present with a history of exposure to flea bites in a plague endemic area. The patient would also present with a fixed rather than fluctuating temperature.

Plasmodium falciparum, the causative agent of malaria, would similarly present with fluctuating temperatures and excessive sweating, though the history would show exposure to mosquito bite in a malaria endemic area

A 17-year-old female presents for review. Four days ago she presented to her doctor with a severe sore throat, lethargy and headache. Her doctor prescribed a course of amoxicillin to treat an upper respiratory tract infection. Two days ago she developed a widespread, pruritic maculopapular rash. Her original symptoms have also not improved. What is the most likely diagnosis?

- ☐ Infectious mononucleosis
- ☐ Kawasaki disease
- ☐ Penicillin allergy
- ☐ HIV seroconversion
- ☐ Beta-lactamase producing streptococcal sore throat

Infectious mononucleosis

73%

Kawasaki disease

5%

Penicillin allergy

9%

HIV seroconversion

4%

Beta-lactamase producing streptococcal sore throat

9%

URTI symptoms + amoxicillin → rash ?glandular fever

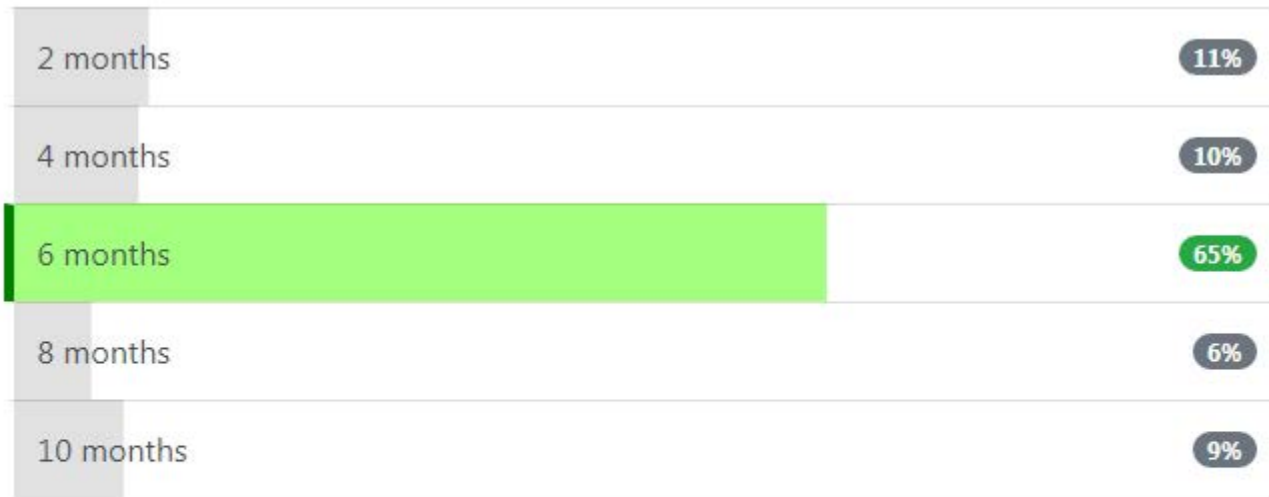
Important for me Less important

A rash develops in around 99% of patients who take amoxicillin whilst they have infectious mononucleosis. Her treatment should be supportive as detailed below.

A 28-year-old female returns from a country that is known to have Zika virus transmission. She presents with fever, headache and myalgia following a mosquito bite. She expresses the wish to have children in the near future.

In view of the possibility of Zika virus, how long should she wait before attempting conception?

- ☐ 2 months
- ☐ 4 months
- ☐ 6 months
- ☐ 8 months
- ☐ 10 months



The answer according to the World Health Organisation is to use barrier methods for 6 months after returning from a category 1 or 2 area

(<http://www.who.int/csr/disease/zika/information-for-travelers/en/>).

A 39-year-old female who has recently emigrated from sub-Saharan Africa is screened for tuberculosis. She reports being fit and well with no past medical history and has never had a BCG vaccination. Her chest x-ray is normal so she has a Mantoux test which is positive. An interferon gamma test is also performed which is positive. A HIV test is requested which is negative. What treatment would you recommend?

- ☐ 3 months of isoniazid (with pyridoxine) and rifampicin OR 6 months of isoniazid (with pyridoxine)
- ☐ Rifampicin, isoniazid, pyrazinamide and ethambutol for 6 months
- ☐ Observe
- ☐ Rifampicin, isoniazid, pyrazinamide and ethambutol for 2 months then step down to rifampicin and isoniazid for 4 months
- ☐ 3 months of pyrazinamide and isoniazid OR 6 months of pyrazinamide

3 months of isoniazid (with pyridoxine) and rifampicin OR 6 months of isoniazid (with pyridoxine)

55%

Rifampicin, isoniazid, pyrazinamide and ethambutol for 6 months

8%

Observe

9%

Rifampicin, isoniazid, pyrazinamide and ethambutol for 2 months then step down to rifampicin and isoniazid for 4 months

19%

3 months of pyrazinamide and isoniazid OR 6 months of pyrazinamide

9%

This patient has latent tuberculosis

Dr Assem

A 34-year-old male returns from India and upon arriving home is diagnosed with pneumonia that is resistant to multiple antibiotics, in particular to imipenem. What is the likely virulence factor which caused the pneumonia?

- ☐ D-alanyl-D-lactate variation leading to loss of affinity
- ☐ New Delhi metallo-beta-lactamase 1
- ☐ Presence of MexAB-OprM efflux pumps
- ☐ Alteration to the penicillin binding protein 2
- ☐ Reduced permeability & ribosomal modification

D-alanyl-D-lactate variation leading to loss of affinity	13%
New Delhi metallo-beta-lactamase 1	51%
Presence of MexAB-OprM efflux pumps	10%
Alteration to the penicillin binding protein 2	16%
Reduced permeability & ribosomal modification	10%

New Delhi metallo-beta-lactamase 1 is the mutation that leads to carbapenem resistance. Typically found in *Klebsiella pneumoniae*, *Escherichia Coli* (E. Coli), *Enterobacter cloacae* and others. First line of management is the old antibiotic colistin and second line may be tigecycline.

D-alanyl-D-lactate variation leading to loss of affinity to antibiotics is the mechanism of VRE (vancomycin resistant enterococci). Vancomycin binds to D-ala-D-ala.

The presence of MexAB-OprM efflux pumps is one of the mechanisms by which *Pseudomonas aeruginosa* is resistant to β -lactams, chloramphenicol, fluoroquinolones, macrolides, novobiocin, sulfonamides, tetracycline, and trimethoprim.

Alteration to the penicillin binding protein 2 is the mechanism behind methicillin-resistant *Staphylococcus aureus*. Mutations in the MEC gene which codes the penicillin binding proteins give *Staphylococcus aureus* its resistance.

A 20-year-old student presents to the Emergency Department three weeks after being scratched by their pet kitten on their left arm. There is a crusted papule at the site of the scratch and painful left axillary lymphadenopathy. Which is the most likely causative organism?

- ☐ Bartonella
- ☐ Coxiella
- ☐ Brucella
- ☐ Mycoplasma
- ☐ Yersinia

Bartonella	67%
Coxiella	10%
Brucella	11%
Mycoplasma	6%
Yersinia	7%

The correct answer is Bartonella, the causative agent of cat scratch disease.

Coxiella burnetii is a gram-negative rod and the causative agent of Q fever, a zoonosis. The history usually includes exposure to farm animals. The clinical presentation is varied and acute infection may result in flu-like symptoms, pneumonia, hepatitis and a potentially fatal endocarditis.

Brucella spp. are gram-negative rods and the causative agent of brucellosis, a zoonosis. The history usually includes exposure to animal fluids (e.g. unpasteurised milk).

Yersinia spp. are gram-negative rods and the causative agents of yersiniosis, a diarrhoeal illness, and plague (*Y. pestis*).

Mycoplasma spp. are gram-indeterminate bacteria, the genus includes over 100 species. They most commonly cause pneumonia (*M. pneumoniae*) and genital tract infections (*M. genitalium*).

A 37-year-old immigrant from Bolivia is admitted to the Emergency Department following a collapse. He is known to have a history of Chagas' disease. Which one of the following complications of Chagas' disease accounts for the majority of mortality in affected patients?

- ☐ Large bowel perforation secondary to megacolon
- ☐ Myocarditis
- ☐ Perinephric abscess
- ☐ Meningoencephalitis
- ☐ Pulmonary haemorrhage

Large bowel perforation secondary to megacolon

22%

Myocarditis

54%

Perinephric abscess

5%

Meningoencephalitis

9%

Pulmonary haemorrhage

10%

Cardiac involvement is the leading cause of death in patients with Chagas' disease

A 42-year-old dentist is reviewed in the medical clinic complaining of persistent lethargy. Routine bloods show abnormal liver function tests so a hepatitis screen is sent. The results are shown below:

Anti-HAV IgG	negative
HBsAg	negative
Anti-HBs	positive
Anti-HBc	negative
Anti-HCV	positive

What do these results most likely demonstrate?

- ☐ Hepatitis B infection
- ☐ Hepatitis C infection
- ☐ Previous vaccination to hepatitis B and C
- ☐ Hepatitis C infection with previous hepatitis B vaccination
- ☐ Hepatitis B and C infection

Dr Assem

Hepatitis B infection	4%
Hepatitis C infection	7%
Previous vaccination to hepatitis B and C	18%
Hepatitis C infection with previous hepatitis B vaccination	66%
Hepatitis B and C infection	5%

Given the deranged liver function tests these results most likely indicate previous hepatitis B vaccination with active hepatitis C infection. However, around 15% of patients exposed to the hepatitis C virus clear the infection. It would therefore be necessary to perform a HCV PCR to see if the virus is still present

There is currently no vaccination for hepatitis C

Which one of the following conditions is not associated with prior Epstein-Barr virus infection?

- ☐ Hodgkin's lymphoma
- ☐ Adult T-cell leukaemia
- ☐ Burkitt's lymphoma
- ☐ Nasopharyngeal carcinoma
- ☐ Hairy leukoplakia

Hodgkin's lymphoma

12%

Adult T-cell leukaemia

49%

Burkitt's lymphoma

7%

Nasopharyngeal carcinoma

12%

Hairy leukoplakia

20%

EBV: associated malignancies:

- Burkitt's lymphoma
- Hodgkin's lymphoma
- nasopharyngeal carcinoma

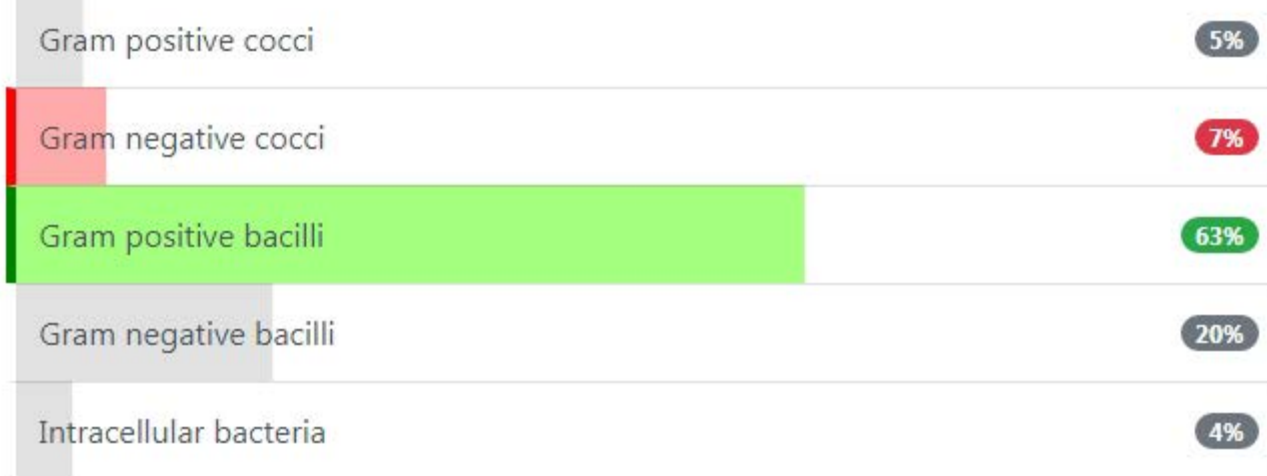
Important for me Less important

Adult T-cell leukaemia is associated with HTLV-1 infection

A 78-year-old woman is admitted to the general medical ward with lobar pneumonia and is commenced on Co-amoxiclav. A few days later, she reports having some loose stool and abdominal pain. Microbiology reports come back positive for *Clostridium difficile*.

Which classification of bacteria do *Clostridium* species belong to?

- ☐ Gram positive cocci
- ☐ Gram negative cocci
- ☐ Gram positive bacilli
- ☐ Gram negative bacilli
- ☐ Intracellular bacteria



Clostridium - Gram-positive rod

Important for me Less important

Clostridium species are classified as gram positive bacilli.

Other gram positive bacilli include:

- *Actinomyces* sp.
- *Bacillus anthracis*
- *Corynebacterium diphtheriae*
- *Listeria monocytogenes*

A 44-year-old man who is known to have HIV is admitted to the Emergency Department following a seizure. He has been taking antiretroviral therapy for the past two years. A CT scan (without contrast) shows a solitary lesion in the basal ganglia. What is the most effective method to help differentiate between lymphoma and toxoplasmosis?

- ☐ MR spectroscopy
- ☐ CT with contrast
- ☐ Thallium SPECT
- ☐ Peripheral blood film
- ☐ Lumbar puncture

MR spectroscopy	13%
CT with contrast	21%
Thallium SPECT	51%
Peripheral blood film	8%
Lumbar puncture	8%

Differentiating between toxoplasmosis and lymphoma is an important aspect of managing neurocomplications relating to HIV. Given the more limited availability of SPECT compared to CT many patients are treated empirically on the basis of scoring systems, for example there is a 90% likelihood of toxoplasmosis if all of the following criteria are met:

- toxoplasmosis IgG in the serum
- CD4 < 100 and not receiving prophylaxis for toxoplasmosis
- multiple ring enhancing lesions on CT or MRI

A 17-year-old girl presents to the emergency department complaining of a widespread erythematous rash. She has recently been commenced on amoxicillin for an upper respiratory tract infection by her general practitioner. Which of the following is the most appropriate test to provide a diagnosis?

- ☐ Blood culture
- ☐ Heterophile antibody test
- ☐ Mast cell tryptase
- ☐ Lymph node biopsy
- ☐ Blood film

Blood culture	4%
Heterophile antibody test	62%
Mast cell tryptase	22%
Lymph node biopsy	4%
Blood film	8%

Heterophile antibodies - infectious mononucleosis

Important for me Less important

Infectious mononucleosis is an important differential to consider in patients presenting with non-specific upper respiratory tract symptoms, especially in the above demographic. In patients with infectious mononucleosis, empirical treatment with amoxicillin often leads to a morbilliform rash. A heterophile antibody test (Paul-Bunnell) has high specificity and moderate sensitivity for infectious mononucleosis.

With the clinical story pointing towards infectious mononucleosis and with nothing in the story suggesting that the patient is septic, blood culture would not be appropriate. Mast cell tryptase is a useful test when investigating an episode of anaphylaxis. Again the clinical story does not fit with this and moreover, the mast cell tryptase test would not provide any useful information in the immediate setting. Whilst a lymph node biopsy can provide further evidence of infectious mononucleosis, given its invasive nature and the rather typical story, it would not be the most appropriate test.

A blood film may show evidence of atypical lymphocytes, but would not provide a definitive diagnosis, especially as that finding is not pathognomonic.

Which one of the following vaccines uses a protein that attaches to the polysaccharide outer coat to make the pathogen more immunogenic?

- ☐ Rabies
- ☐ Yellow fever
- ☐ Oral polio
- ☐ Measles
- ☐ Meningococcus



A 27-year-old bisexual man presents to your GUM clinic with a 7-day history of rectal discharge, pain on passing stools and tenesmus. On examination, he has tender inguinal lymphadenopathy and proctoscopy reveals red mucosa with yellow discharge and some shallow ulcers.

Which one of the following organisms is most likely to be causative?

- ☐ *Enterococcus coli*
- ☐ *Treponema pallidum*
- ☐ *Haemophilus ducreyi*
- ☐ *Neisseria gonorrhoea*
- ☐ *Chlamydia trachomatis*

Enterococcus coli

4%

Treponema pallidum

9%

Haemophilus ducreyi

18%

Neisseria gonorrhoea

21%

Chlamydia trachomatis

48%

If a sexually active patient presents with genital chlamydia and bowel symptoms, LGV proctocolitis should be considered

Important for me [Less important](#)

The presence of ulcers and significant rectal symptoms in a sexually active man raises the question of lymphogranuloma venereum, which is caused by a type of *Chlamydia trachomatis*. Rectal infection with gonorrhoea could cause similar symptoms but would not be expected to cause ulcers.

A 34-year-old man is diagnosed as being HIV positive. He was born and brought up in the United Kingdom and is currently fit and well with no past medical history. At what point should anti-retroviral therapy be started?

☐ At the time of diagnosis

☐ $CD4 < 200 \times 10^6/l$

☐ $CD4 < 250 \times 10^6/l$

☐ $CD4 < 300 \times 10^6/l$

☐ $CD4 < 350 \times 10^6/l$

At the time of diagnosis

74%

CD4 < 200 * 10

6

/1

9%

CD4 < 250 * 10

6

/1

6%

CD4 < 300 * 10

6

/1

3%

CD4 < 350 * 10

6

/1

8%

Anti-retroviral therapy for HIV is now started at the time of diagnosis, rather than waiting for the CD4 count to drop to a particular level

Important for me Less important

A 24-year-old woman presents due to an itchy vulva and pain during sex. She also mentions a green, offensive vaginal discharge for the past 2 weeks. What is the most likely diagnosis?

- ☐ *Candida*
- ☐ Bacterial vaginosis
- ☐ Gonorrhoea
- ☐ *Trichomonas vaginalis*
- ☐ *Chlamydia*

Candida

5%

Bacterial vaginosis

24%

Gonorrhoea

10%

Trichomonas vaginalis

52%

Chlamydia

9%

A 34-year-old postman attends the Emergency Department following a dog bite to his right hand. What is the most appropriate antibiotic therapy?

☐ Metronidazole + amoxicillin

☐ Erythromycin

☐ Co-amoxiclav

☐ Metronidazole

☐ Flucloxacillin + penicillin

Metronidazole + amoxicillin

24%

Erythromycin

3%

Co-amoxiclav

54%

Metronidazole

8%

Flucloxacillin + penicillin

10%

Animal bite - co-amoxiclav

Important for me Less important

A combination of doxycycline and metronidazole is recommended in the BNF if the patient is penicillin allergic

Dr Assem

A 30-year-old man has returned from South America after one week. He has developed a mild fever, muscle pain, headache and conjunctivitis. He has been taking his anti-malarial tablets. What is the most likely diagnosis?

- ☐ Dengue
- ☐ Chikungunya
- ☐ Malaria
- ☐ Influenza
- ☐ Zika



Zika, Chikungunya and Dengue can produce similar symptoms. Zika is prevalent in South America. It tends to cause mild fever whereas dengue and chikungunya tend to cause abrupt onset of high fever. Chikungunya and dengue would cause more joint pain and conjunctivitis is less common with these conditions. He has been taking his antimalarials making malaria less likely. Influenza could be a consideration but because of the recent travel history zika should be considered first.

A 30-year-old HIV positive man attends your travel clinic asking for your advice on holiday vaccinations. He is taking anti-retroviral therapy and his most recent CD4 count is 200 cells/mm³. He is otherwise well and has no other medical conditions.

Which of the following vaccines are contraindicated in this man?

- ☐ Rabies
- ☐ Meningitis ACWY
- ☐ Japanese encephalitis
- ☐ Tuberculosis (BCG)
- ☐ Hepatitis B



Live attenuated vaccines such as BCG are contraindicated in all HIV positive patients.

Other live attenuated vaccines which should not be given in immunocompromised patients are:

- Yellow fever
- Oral polio
- Intranasal influenza
- Varicella
- Measles, mumps and rubella (MMR)

Source: uptodate

A 37-year-old sewer worker presents to the Emergency Department with flu-like symptoms and pyrexia for the past 3 days. Since this morning he has started to develop a headache and signs of meningism are found on examination. Blood tests show:

Sodium	145 mmol/l
Potassium	4.7 mmol/l
Urea	10.3 mmol/l
Creatinine	133 μ mol/l

What is the antibiotic treatment of choice?

- ☐ Co-trimoxazole
- ☐ Ciprofloxacin
- ☐ Metronidazole
- ☐ Benzylpenicillin
- ☐ Erythromycin

Co-trimoxazole

9%

Ciprofloxacin

13%

Metronidazole

9%

Benzylpenicillin

56%

Erythromycin

12%

Leptospirosis - give penicillin or doxycycline

Important for me

Less important

This patient has leptospirosis. The treatment of choice is benzylpenicillin. A lumbar puncture should ideally be done first to confirm meningeal involvement.

Dr Assem

A 23-year-old soldier who returned from a tour of Afghanistan 2 months ago presents with a large painless ulcer on the back of his hand. He reports that it started as a small papule and gradually enlarged. On examination he has a 3cm ulcer with a central depression and a raised indurated border. He is otherwise well in himself and has no other medical problems.

What is the likely diagnosis?

- ☐ Cutaneous leishmaniasis
- ☐ Sarcoidosis
- ☐ Primary syphilis
- ☐ Pyoderma gangrenosum
- ☐ Buruli ulcer

Cutaneous leishmaniasis	65%
Sarcoidosis	3%
Primary syphilis	10%
Pyoderma gangrenosum	7%
Buruli ulcer	16%

Given the travel history to Afghanistan and the painless single lesion the most likely explanation is cutaneous leishmaniasis. Primary syphilis may present with a single painless lesion but the large size and location on the back of the hand is unusual. Pyoderma gangrenosum you would expect to be painful and present more acutely. A buruli ulcer is an ulcer caused by mycobacterium ulcerans and can present like this but is rare, usually found in children and has not been reported in the Middle East.

Source: WHO fact sheets on leishmaniasis

Cutaneous leishmaniasis is transmitted by sandflies and usually presents as an erythematous patch or papule which gradually enlarges and becomes an ulcer with a raised indurated border. In 'dry' forms the lesion is crusted with a raised edge. It is usually painless unless a secondary bacterial infection is present. Afghanistan has particularly high levels of cutaneous leishmaniasis.

A 17-year-old male presents with a severe sore throat, fever and lethargy. On examination he is noted to have cervical lymphadenopathy. He has now been unwell for 6 days. A blood test is taken the next day:

Hb	15.5 g/L	Male: (135-180) Female: (115 - 160)
Platelets	$300 \times 10^9/L$	(150 - 400)
WBC	$9 \times 10^9/L$	(4.0 - 11.0)
Neuts	$3 \times 10^9/L$	(2.0 - 7.0)
Lymphs	$5.5 \times 10^9/L$	(1.0 - 3.5)
Mono	$0.5 \times 10^9/L$	(0.2 - 0.8)
Eosin	$0.1 \times 10^9/L$	(0.0 - 0.4)
Heterophil antibody test	POSITIVE	

What is the most appropriate next step in management?

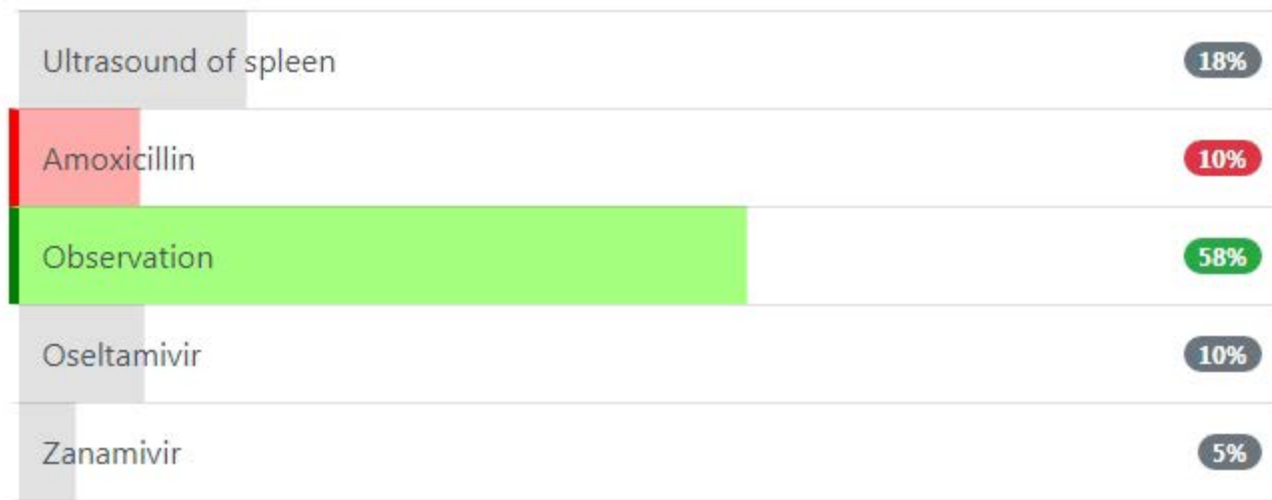
☐ Ultrasound of spleen

☐ Amoxicillin

☐ Observation

☐ Oseltamivir

☐ Zanamivir



Infectious mononucleosis is generally a self-limiting condition

Important for me Less important

This patient has infectious mononucleosis. No active treatment is required although patients should be counselled regarding the need to avoid contact sports for 8 weeks given the risk of splenic rupture.

A 25-year-old intravenous drug user with chronic hepatitis C becomes pregnant. Approximately what is the chance of the virus being transmitted to her child?

☐ <10%

☐ 10-20%

☐ 20-30%

☐ 30-40%

☐ 40-50%

<10%

47%

10-20%

22%

20-30%

16%

30-40%

8%

40-50%

8%

A 19-year-old man presents with an annular rash, pyrexia and polyarthralgia to the Emergency Department. He has just returned from the New Forest and remembers being bitten by a tick. Given the likely diagnosis, what is the most appropriate antibiotic therapy?

- ☐ Ciprofloxacin
- ☐ Amoxicillin
- ☐ Metronidazole
- ☐ Doxycycline
- ☐ Ceftriaxone



First line treatment for early Lyme disease is a 14-21 day course of oral doxycycline

Important for me Less important

As he only has features of early disease, doxycycline is sufficient.

A 31-year-old woman presents as she has noted an offensive, fishy vaginal discharge. She describes a grey, watery discharge. What is the most likely diagnosis?

☐ *Trichomonas vaginalis*

☐ *Candida*

☐ *Chlamydia*

☐ Bacterial vaginosis

☐ Physiological discharge

Trichomonas vaginalis

23%

Candida

5%

Chlamydia

5%

Bacterial vaginosis

64%

Physiological discharge

3%

A 12-year-old boy who had a splenectomy following a road traffic accident is reviewed in clinic. He had his full immunisation course as a child and was given a repeat pneumococcal vaccination 5 days following surgery. What is the most appropriate ongoing management?

- ☐ Booster dose of Hib and MenC vaccine + lifelong penicillin V
- ☐ Booster dose of Hib and MenC vaccine + penicillin V for 2 years
- ☐ Lifelong penicillin V
- ☐ Booster dose of Hib and MenC vaccine + annual influenza vaccination + penicillin V for 2 years
- ☐ Booster dose of Hib and MenC vaccine + annual influenza vaccination + lifelong penicillin V

Booster dose of Hib and MenC vaccine + lifelong penicillin V	7%
Booster dose of Hib and MenC vaccine + penicillin V for 2 years	4%
Lifelong penicillin V	9%
Booster dose of Hib and MenC vaccine + annual influenza vaccination + penicillin V for 2 years	23%
Booster dose of Hib and MenC vaccine + annual influenza vaccination + lifelong penicillin V	57%

Debate still exists regarding how long a patient should take penicillin prophylaxis for. The majority of doctors advocate lifelong penicillin. Consensus guidelines agree however that In this case prophylaxis should be continued until the patient is at least 16 years old, so of the available options E is the correct answer

Dr Aslam

A 31-year-old female with no past medical history of note is admitted to hospital with dyspnoea and fever. She has recently returned from holiday in Turkey. A clinical diagnosis of pneumonia is made. On examination she is noted to have an ulcerated lesion on her upper lip consistent with reactivation of herpes simplex. Which organism is most associated with this examination finding?

- ☐ *Legionella pneumophila*
- ☐ *Staphylococcus aureus*
- ☐ *Streptococcus pneumoniae*
- ☐ *Pneumocystis carinii*
- ☐ *Mycoplasma pneumoniae*

Legionella pneumophila

16%

Staphylococcus aureus

13%

Streptococcus pneumoniae

42%

Pneumocystis carinii

12%

Mycoplasma pneumoniae

17%

Streptococcus pneumoniae is associated with cold sores

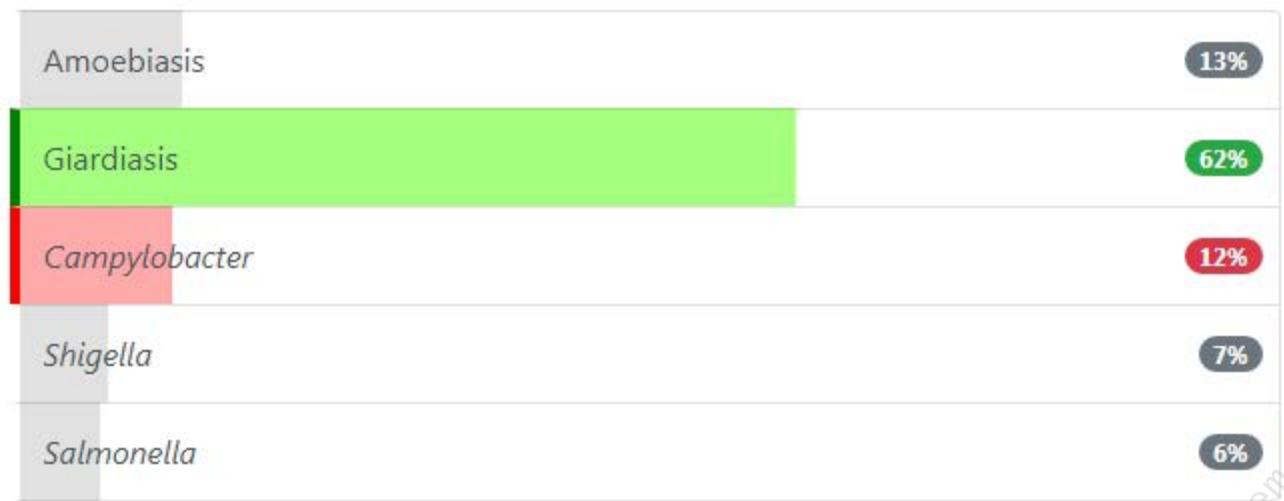
Important for me Less important

Streptococcus pneumoniae commonly causes reactivation of the herpes simplex virus resulting in 'cold sores'

Dr Assem

A 29-year-old man presents with a nine day history of watery diarrhoea that developed one week after returning from India. He had travelled around northern India for two months. On examination he is afebrile and his abdomen is soft and non-tender. What is the most likely causative organism?

- ☐ Amoebiasis
- ☐ Giardiasis
- ☐ *Campylobacter*
- ☐ *Shigella*
- ☐ *Salmonella*

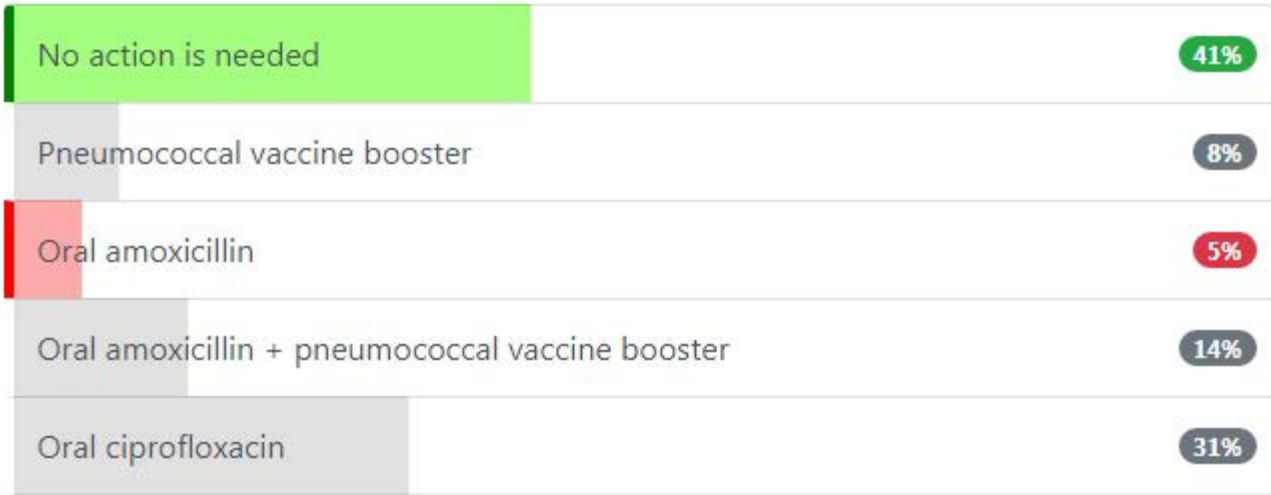


The incubation period and prolonged, non-bloody diarrhoea point towards giardiasis

A 7-year-old boy is admitted to hospital after presenting with fever, headache and neck stiffness. A diagnosis of pneumococcal meningitis is made. There are no other reports of meningitis in the local area over the past 4 weeks.

How should the close contacts of this boy be managed?

- ☐ No action is needed
- ☐ Pneumococcal vaccine booster
- ☐ Oral amoxicillin
- ☐ Oral amoxicillin + pneumococcal vaccine booster
- ☐ Oral ciprofloxacin



Carriage of pneumococcus is extremely common and no antibiotic prophylaxis is generally required in this situation. There are however exceptions to this if a 'cluster' of cases develop - please the HPA link for more details.

A 43-year-old man from Sierra Leone presents with a flu-like illness. On examination he has very large posterior cervical lymph nodes. A diagnosis of African trypanosomiasis is confirmed on blood smear. What is the most appropriate treatment?

☐ Atovaquone-proguanil

☐ Sodium stibogluconate

☐ Benznidazole

☐ Metronidazole

☐ Pentamidine

Atovaquone-proguanil

7%

Sodium stibogluconate

8%

Benznidazole

30%

Metronidazole

5%

Pentamidine

51%

A 26-year-old man returns to the genito-urinary medicine clinic. He is a known intravenous drug user. Five days ago he was seen with a urethral discharge. A swab taken in the clinic showed a Gram-negative diplococcus and treatment with IM ceftriaxone was given. Unfortunately his symptoms have not resolved. What is the most likely explanation?

- ☐ Gonorrhoea-resistant to ceftriaxone
- ☐ Co-existent *Candida* infection
- ☐ HIV infection
- ☐ Co-existent syphilis infection
- ☐ Co-existent *Chlamydia* infection

Gonorrhoea-resistant to ceftriaxone			21%
Co-existent	<i>Candida</i>	infection	7%
HIV infection			9%
Co-existent syphilis infection			5%
Co-existent	<i>Chlamydia</i>	infection	58%

Co-existent infection with *Chlamydia* is extremely common in patients with gonorrhoea.

Which one of the following viruses is associated with nasopharyngeal carcinoma?

- ☐ Adenovirus
- ☐ Rhinovirus
- ☐ Herpes simplex virus
- ☐ Epstein-Barr virus
- ☐ Picornavirus

Adenovirus

5%

Rhinovirus

3%

Herpes simplex virus

6%

Epstein-Barr virus

81%

Picornavirus

4%

EBV: associated malignancies:

- Burkitt's lymphoma
- Hodgkin's lymphoma
- nasopharyngeal carcinoma

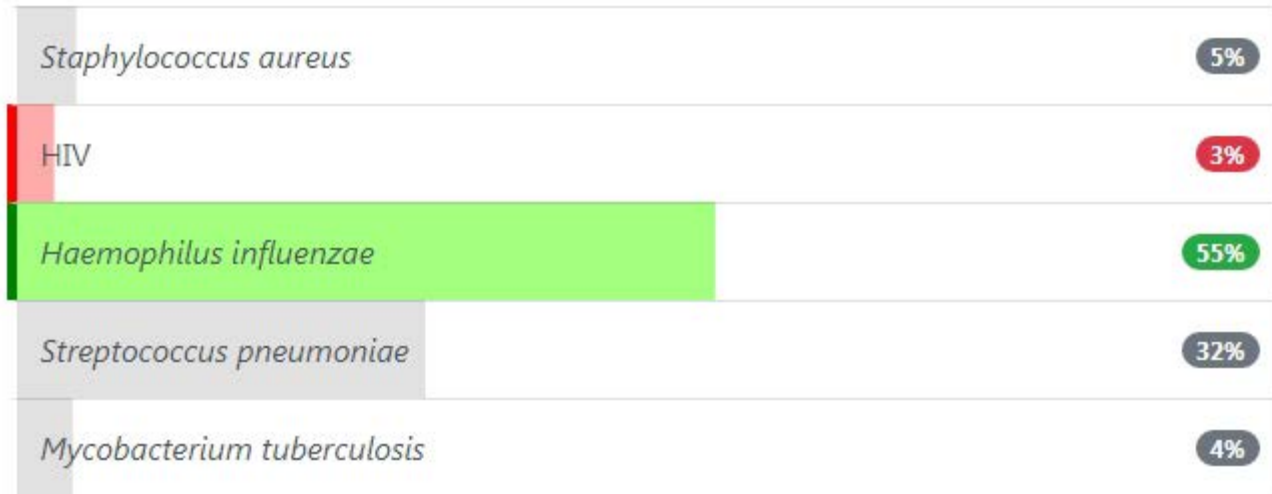
Important for me Less important

You review a 14-year-old boy who has recently emigrated from Russia. He was involved in a car accident two years ago and underwent an emergency splenectomy.

Following the accident, he takes penicillin V on a daily basis. He is unsure of his vaccination history.

Which organism is he particularly susceptible to?

- ☐ *Staphylococcus aureus*
- ☐ HIV
- ☐ *Haemophilus influenzae*
- ☐ *Streptococcus pneumoniae*
- ☐ *Mycobacterium tuberculosis*



Penicillin V would protect him against *Streptococcus pneumoniae* but not *Haemophilus influenzae* due to the production of beta-lactamases by the organism.

A 44-year-old man who is known to be HIV positive presents with shortness-of-breath. Which one of the following features is most characteristic of *Pneumocystis carinii* pneumonia?

- ☐ Usually occurs when the CD4 count is 200-300/mm³
- ☐ Absence of fever
- ☐ Productive cough
- ☐ Oxygen saturations usually improve after short period of exertion
- ☐ Normal chest auscultation

Usually occurs when the CD4 count is 200-300/mm³

16%

Absence of fever

11%

Productive cough

6%

Oxygen saturations usually improve after short period of exertion

8%

Normal chest auscultation

59%

A 31-year-old woman with a three year history of ulcerative colitis is started on azathioprine to help prevent relapses. Which one of the following vaccines must be avoided whilst she is on this treatment?

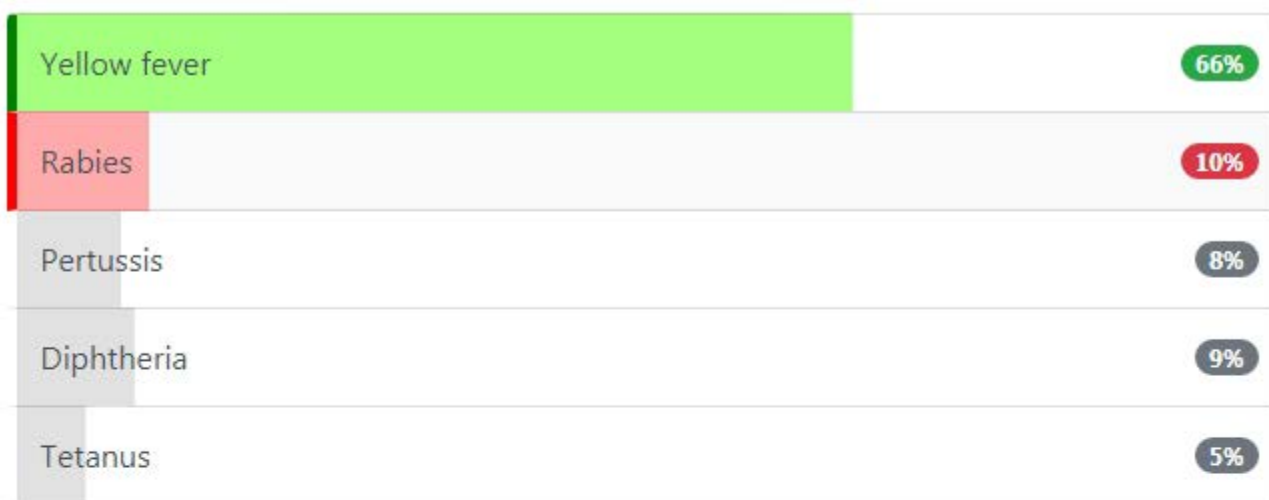
☐ Yellow fever

☐ Rabies

☐ Pertussis

☐ Diphtheria

☐ Tetanus



Live attenuated vaccines

- BCG
- MMR
- oral polio
- yellow fever
- oral typhoid

Important for me Less important

Live vaccines should not be given to patients who are immunosuppressed, such as those taking azathioprine.

A 28-year-old medical student presents to the infectious diseases ward with fevers, lethargy and a productive cough that has been ongoing for two weeks. He has recently returned to the UK following an elective period spent volunteering in refugee camps overseas. He has no significant past medical history. Prior to his travel, the patient received all appropriate vaccinations and received the BCG vaccine prior to starting his studies 4 years ago.

White Cell Count	13 x10 ⁹ /l
C-reactive Protein	240 mg/L
Na ⁺	137 mmol/L
Chest X-ray	Left upper zone consolidation
Sputum appearances	Mucopurulent with streaks of blood
Sputum cultures	Awaited

What is the most likely causative organism for the patient's pneumonia?

- ☐ *Staphylococcus aureus*
- ☐ *Mycoplasma pneumoniae*
- ☐ *Mycobacterium tuberculosis*
- ☐ *Klebsiella pneumoniae*
- ☐ *Legionella pneumophila*

<i>Staphylococcus aureus</i>	16%
<i>Mycoplasma pneumoniae</i>	16%
<i>Mycobacterium tuberculosis</i>	41%
<i>Klebsiella pneumoniae</i>	11%
<i>Legionella pneumophila</i>	15%

The BCG vaccine is unreliable in protecting against pulmonary tuberculosis

Important for me Less important

Although the BCG is routinely given to people at high risk of exposure through occupation, its strengths lie in preventing extrapulmonary manifestations of tuberculosis, rather than the more common, pulmonary form. This patient has spent a prolonged period of time working in refugee camps, which tend to be overcrowded, creating an environment in which TB can spread rapidly amongst inhabitants.

Pneumonia caused *Staphylococcus aureus* often is preceded by a viral illness such as influenza.

Mycoplasma pneumoniae frequently causes mild cases of pneumonia, otherwise referred to 'Walking pneumonia'. Systemic symptoms are less common, and it usually presents with a non-productive cough.

Klebsiella pneumoniae often causes cavitating lung lesions and is most commonly associated with pneumonia in patients with a history of alcohol excess.

Legionella pneumophila is often accompanied by more generalised symptoms, such as diarrhoea and myalgia. It is also associated with hyponatraemia, however the mechanism through which this occurs is unclear.

You are speaking to the partner of a 28-year-old man who has recently been admitted with pyrexia and neck stiffness. The results of initial investigations are shown below:

Serum glucose	5.0 mmol/l
---------------	------------

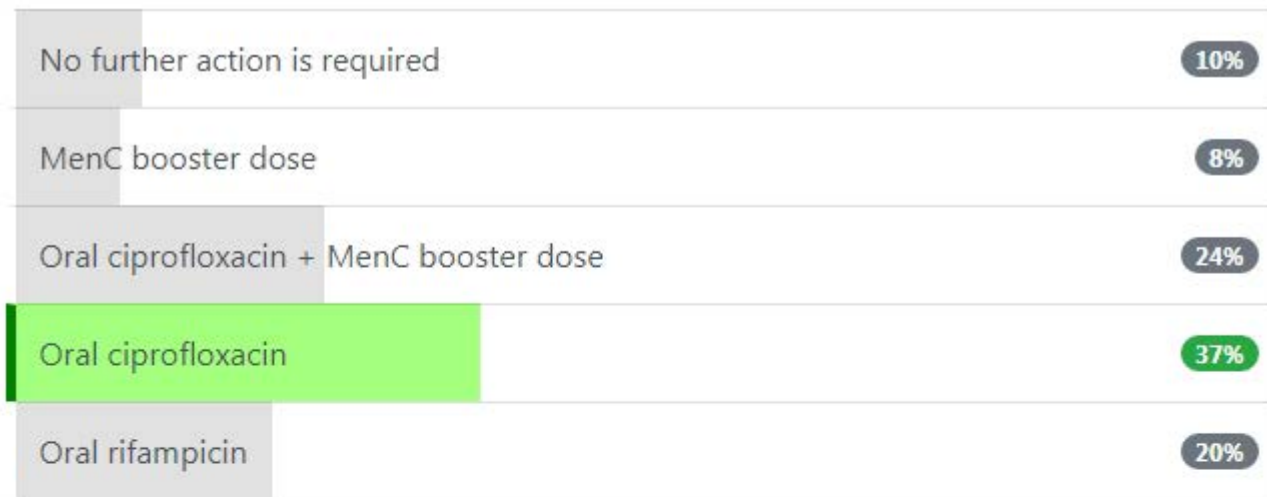
Lumbar puncture:

Appearance	Cloudy
Glucose	1.2 mmol/l
Protein	1.8 g/l
White cells	450 / mm ³ (85% polymorphs)
Microscopy	Gram-negative diplococci

No other results concerning the serotype of the organism are available.

The partner is 27-years-old and has no past medical history of note other than depression for which she takes fluoxetine. She has had a full course of immunisations including a course of MenC vaccines whilst at university 8 years ago. What is the most appropriate next step to reduce her chance of developing meningitis?

- ☐ No further action is required
- ☐ MenC booster dose
- ☐ Oral ciprofloxacin + MenC booster dose
- ☐ Oral ciprofloxacin
- ☐ Oral rifampicin



Tough question. Clearly the patient has meningitis which the CSF microscopy confirms as being due to meningococcal disease.

Firstly there is the choice between ciprofloxacin and rifampicin. Rifampicin has been historically used for this purpose but the most recent guidance from the Health Protection Agency and the Greenbook supports the use of ciprofloxacin.

Secondly there is the question as to whether a booster dose of vaccine is needed. The guidelines regarding this are worded vaguely but imply that most close contacts should receive a booster dose/complete course of vaccine depending on the serotype of the organism. As this is not known, only oral chemoprophylaxis should be given for now, with the vaccine given once this is ascertained. Please see the HPA link for more details.

A 35-year-old man who has recently immigrated from Zimbabwe to the UK presents to the emergency department with fever, myalgia and headaches. He is suspected to have malaria.

Which test is most likely to allow for accurate speciation of the malarial pathogen?

- ☐ Thick blood film
- ☐ Thin blood film
- ☐ Quantitative buffy coat analysis
- ☐ Blood cultures
- ☐ Point of care malaria test

Thick blood film

29%

Thin blood film

58%

Quantitative buffy coat analysis

6%

Blood cultures

3%

Point of care malaria test

4%

Thick blood films check for parasite burden, thin films allow for speciation

Important for me Less important

- 1) **Parasite burden** is evaluated from **thick** blood films, while thin films allow for speciation.
- 2) Thin peripheral blood films allow for better visualisation of the parasites and therefore speciation
- 3) Quantitative buffy coat analysis is performed by centrifuging the blood sample, and examining the interface between the buffy coat (layer of platelets and white cells) and the red cells for parasites. This test is more sensitive than thick smears at diagnosis of parasitaemia, however isn't as good as thin smears for speciation.
- 4) Blood cultures allow for bacterial growth and speciation however have no role in the diagnosis of parasitic diseases
- 5) These allow for rapid diagnosis and diagnosis-led treatment in resource limited areas, rather than blind treatment which may promote the development of resistance. They are not able to differentiate between the various species of non-falciparum malaria.

Which one of the following is least associated with rabies?

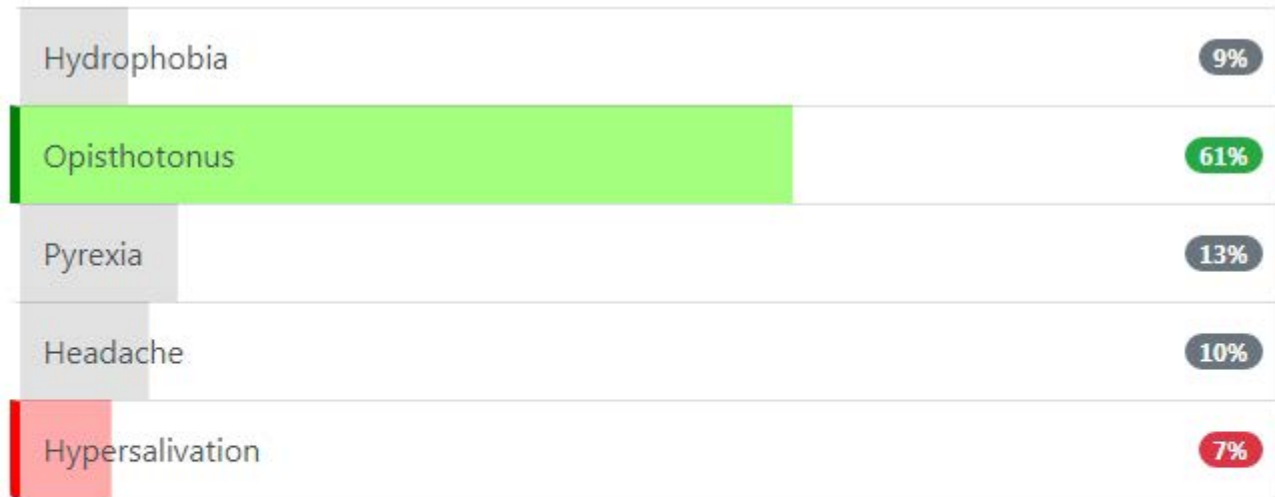
☐ Hydrophobia

☐ Opisthotonus

☐ Pyrexia

☐ Headache

☐ Hypersalivation



Opisthotonus is associated more with tetanus. It describes a state of a hyperextension and spasticity in which a patient's neck and spinal column enter into an arching position. It is an extrapyramidal effect and is caused by spasm of the axial muscles

A 19-year-old man presents with a compound fracture of his leg following a fall from scaffolding. Examination reveals soiling of the wound with mud. He is sure he has had five previous tetanus vaccinations. What is the most appropriate course of action to prevent the development of tetanus?

- ☐ Clean wound + intramuscular human tetanus immunoglobulin
- ☐ Clean wound + tetanus vaccine
- ☐ Clean wound + tetanus vaccine + intramuscular human tetanus immunoglobulin
- ☐ Clean wound + tetanus vaccine + benzylpenicillin
- ☐ Clean wound

Clean wound + intramuscular human tetanus immunoglobulin	38%
Clean wound + tetanus vaccine	13%
Clean wound + tetanus vaccine + intramuscular human tetanus immunoglobulin	22%
Clean wound + tetanus vaccine + benzylpenicillin	15%
Clean wound	12%

A soiled, compound fracture is regarded as high-risk for tetanus and intramuscular human tetanus immunoglobulin should be given. There is a role for antibiotics given the soiled wound although benzylpenicillin would not be the drug of choice.

A 25-year-old woman has recently moved to the United Kingdom from sub-Saharan Africa to attend University. She comes from an area where there is a high prevalence of tuberculosis (TB). The patient is not pregnant and is currently asymptomatic. She thinks she may have had a BCG vaccination in the past but is not sure. She has no other medical history and is a non-smoker.

Which test should initially be used to screen this lady for TB?

- ☐ Mantoux test
- ☐ Interferon gamma blood test
- ☐ Early morning urine sample
- ☐ Chest x-ray
- ☐ Send three sputum samples

Mantoux test	74%
Interferon gamma blood test	15%
Early morning urine sample	2%
Chest x-ray	5%
Send three sputum samples	4%

The patient is asymptomatic so we can say she does not have active TB. However, she may have latent TB. TB is not easily caught and requires prolonged close contact. The recent NICE guidelines state that the initial screening test is the Mantoux test. The interpretation has also changed in the recent guidelines. A diameter of 5 mm is considered positive regardless of BCG history.

Changes on the chest x-ray cannot always differentiate between active and latent TB.

Interferon gamma blood test is recommended if the Mantoux test is positive.

An early morning urine sample is no longer recommended.

The patient is currently asymptomatic and therefore we cannot collect sputum.

A 63-year-old man who migrated from India 7 months ago is referred to the acute medical unit with a history of headache and pyrexia. A lumbar puncture suggests a diagnosis of meningeal tuberculosis. What treatment should he be started on?

- ☐ Rifampicin, isoniazid, pyrazinamide and ethambutol
- ☐ Rifampicin and streptomycin
- ☐ Rifampicin, isoniazid, pyrazinamide, ethambutol and streptomycin
- ☐ Rifampicin and isoniazid with prednisolone
- ☐ Rifampicin, isoniazid, pyrazinamide and ethambutol with prednisolone

Rifampicin, isoniazid, pyrazinamide and ethambutol

17%

Rifampicin and streptomycin

3%

Rifampicin, isoniazid, pyrazinamide, ethambutol and streptomycin

11%

Rifampicin and isoniazid with prednisolone

7%

Rifampicin, isoniazid, pyrazinamide and ethambutol with prednisolone

61%

The use of steroids in patients with tuberculous meningitis is supported by a Cochrane review in 2008

Dr Assem

A 67-year-old man is referred to the respiratory clinic. He has a past history of tuberculosis as a child but is otherwise normally fit and well. Over the past two months he has had a cough, lost one stone in weight and had four episodes of haemoptysis. A chest x-ray shows a solid mass occupying the right upper zone. Investigation results include the following:

Aspergillus precipitin antibody	Positive
---------------------------------	----------

What is the most likely diagnosis?

- ☐ Lung abscess
- ☐ Invasive aspergillosis
- ☐ Aspergilloma
- ☐ Reactivation of primary tuberculosis
- ☐ Allergic bronchopulmonary aspergillosis

Lung abscess

3%

Invasive aspergillosis

11%

Aspergilloma

69%

Reactivation of primary tuberculosis

7%

Allergic bronchopulmonary aspergillosis

10%

A 31-year-old man is admitted to hospital with a 4 day history of fever and dyspnoea. He is known to be HIV positive but poorly compliant with his antiretroviral therapy (ART). Bloods taken during a clinic visit two weeks ago show the following:

CD4	180 cells/ μ l
-----	--------------------

On examination today his pulse is 102/min, oxygen saturations 97% on room air with a temperature of 38.1°C. He has coarse crackles on the right side of his chest. A chest x-ray shows consolidation of the right mid zone.

What is the most likely causative organism?

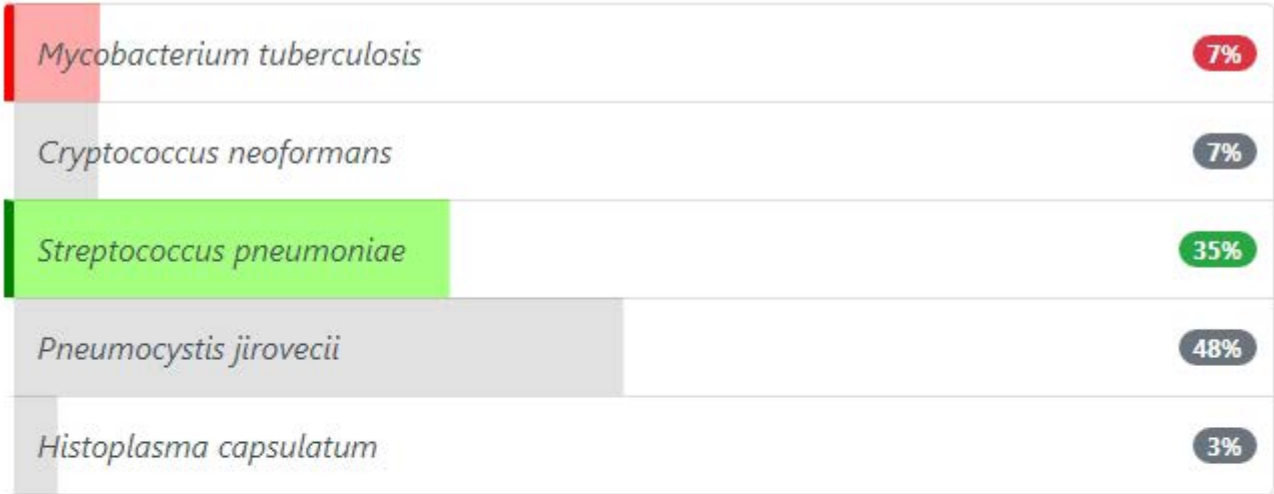
☐ *Mycobacterium tuberculosis*

☐ *Cryptococcus neoformans*

☐ *Streptococcus pneumoniae*

☐ *Pneumocystis jirovecii*

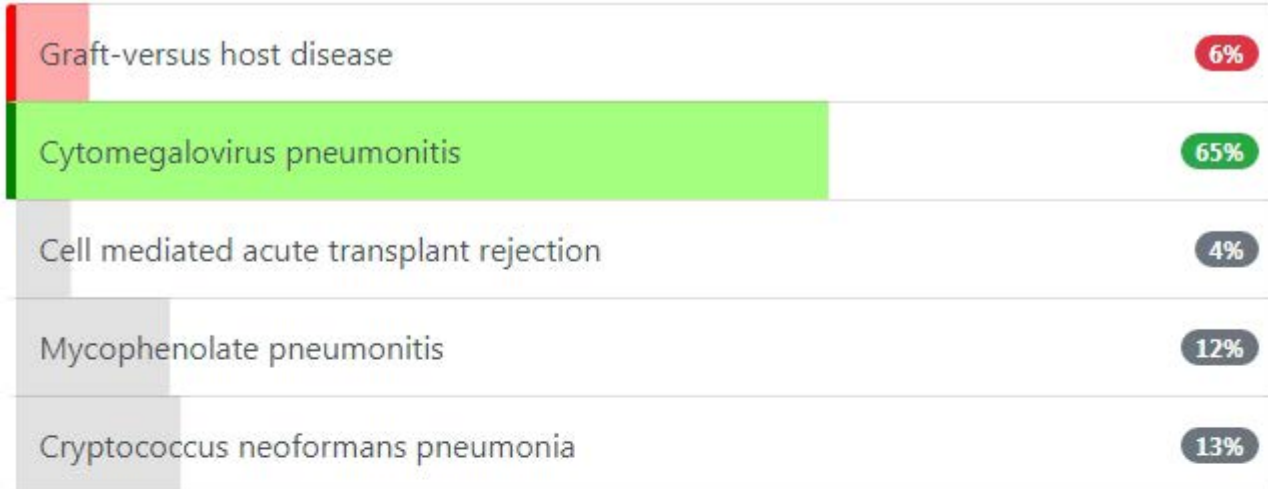
☐ *Histoplasma capsulatum*



Whilst *Pneumocystis jirovecii* is of course associated with HIV, patients who are immunocompromised are more likely to develop infections due to the common pathogens which affect immunocompetent individuals. *Streptococcus pneumoniae* is therefore the most likely cause of community-acquired pneumonia in this patient. Remember also that *Pneumocystis jirovecii* tends to present in a different way, with very few chest signs and bilateral interstitial pulmonary infiltrates on chest x-ray.

You review a 45-year-old woman who has been admitted feeling generally unwell. Four months ago she had a renal transplant and has since been taking a combination of ciclosporin and mycophenolate for immunosuppression. For the past three days she has had fever, dyspnoea and a dry cough. A chest x-ray shows bilateral interstitial infiltrates. What is the most likely diagnosis?

- ☐ Graft-versus host disease
- ☐ Cytomegalovirus pneumonitis
- ☐ Cell mediated acute transplant rejection
- ☐ Mycophenolate pneumonitis
- ☐ Cryptococcus neoformans pneumonia



Renal transplant + infection ?CMV

Important for me Less important

Over 50% of renal transplant patients have a significant infection within the first 12 months of having a renal transplant.

At the time of transplant the CMV-serological status of the donor and recipient are noted. The highest risk is seen in CMV-seronegative recipients who receive a kidney from a CMV-seropositive donor. These patients are usually given antiviral prophylaxis.

Cytomegalovirus tend to be seen after four weeks as before this time the immune system has not been fully affected by the immunosuppressants.

A 64-year-old gentleman with chronic obstructive pulmonary disease presents to the GP with increasing dyspnoea. He is febrile and gives a history of a cough productive of green sputum over the last few days. You diagnose an infective exacerbation of his underlying lung disease. After sending a sputum sample you make the decision to start oral steroids and appropriate antibiotics. On reviewing the results of the sputum sample the lab has reported an initial culture of a Gram-negative cocci. What is the most likely organism?

☐ *Haemophilus influenzae*

☐ *Moraxella catarrhalis*

☐ *Neisseria meningitidis*

☐ *Pseudomonas aeruginosa*

☐ *Streptococcus pneumoniae*

Haemophilus influenzae

22%

Moraxella catarrhalis

44%

Neisseria meningitidis

16%

Pseudomonas aeruginosa

11%

Streptococcus pneumoniae

7%

Moraxella catarrhalis - Gram-negative cocci

Important for me Less important

Of all the available organisms only *Neisseria* and *Moraxella* are Gram-negative cocci. *Neisseria meningitidis* is not a common respiratory pathogen and therefore the likely organism in this case is *Moraxella*.

Moraxella catarrhalis is a Gram-negative coccus that is a common cause of respiratory infections in patients with underlying lung disease. It also commonly causes sinusitis and middle ear infections.

Dr. Assem

A 55-year-old business man presents with a 15 day history of watery, non-bloody diarrhoea associated with anorexia and abdominal bloating. His symptoms started 4 days after returning from a trip to Pakistan. On examination he is afebrile with dry mucous membranes but normal skin turgor. Given the likely organism, what is the most appropriate treatment?

☐ Hydroxychloroquine

☐ Aciclovir

☐ Benzylpenicillin

☐ Ciprofloxacin

☐ Metronidazole



Although *Escherichia coli* is the most common cause of travellers' diarrhoea, in this particular case the length of illness and nature of symptoms (bloating, watery diarrhoea) points to a diagnosis of Giardiasis.

A 20-year-old woman was admitted overnight with suspected meningitis. You are asked to review the initial microscopy results from the lumbar puncture. The lab tells you the culture is growing gram negative diplococci.

What is the most likely organism?

☐ *Streptococcus pneumoniae*

☐ *Listeria monocytogenes*

☐ *Escherichia coli*

☐ *Haemophilus influenzae*

☐ *Neisseria meningitidis*

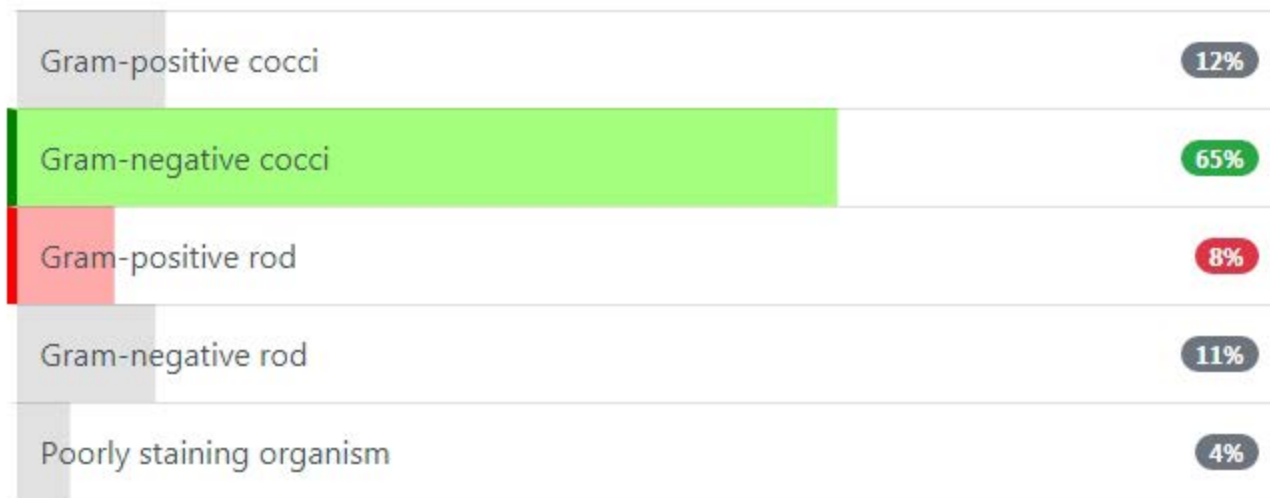
<i>Streptococcus pneumoniae</i>	4%
<i>Listeria monocytogenes</i>	5%
<i>Escherichia coli</i>	3%
<i>Haemophilus influenzae</i>	4%
<i>Neisseria meningitidis</i>	84%

Neisseria meningitis and *Streptococcus pneumoniae* would be most common in this age group but it is *N.meningitis* that is a gram negative diplococci.

- *S. pneumoniae* is a gram positive diplococci/chain
- *E. coli* is a gram negative bacilli
- *H. influenzae* is a gram negative coccobacilli
- *L. monocytogenes* is a gram positive rod

An 18-year-old male is admitted with fever, headache and neck stiffness. He receives IV ceftriaxone. A lumbar puncture and culture of his cerebrospinal fluid reveal that the pathogenic organism is *Neisseria meningitidis*. What is the appearance of this bacterium on gram staining?

- ☐ Gram-positive cocci
- ☐ Gram-negative cocci
- ☐ Gram-positive rod
- ☐ Gram-negative rod
- ☐ Poorly staining organism



Neisseria gonorrhoeae - Gram-negative cocci

Important for me Less important

Neisseria species are gram-negative cocci. The bacteria cluster together in pairs to form diplococci. Other important gram-negative cocci include *Moraxella catarrhalis* and *Haemophilus influenza*.

Interpretation of gram stains for the non-microbiologist
Barenfanger and Drake. Laboratory medicine. 2001, number 7, vol 32

An 82-year-old gentleman admitted with back pain to a medical ward for a magnetic resonance imaging of his spine has a background of prostate cancer under surveillance and a long-term catheter inserted a few weeks ago by urology. A midstream specimen of urine was positive for extended spectrum beta-lactamases (ESBL) (>100.000 colonies). He claims he has no dysuria and urine in catheter bag looks clear and there are no signs of hematuria. He is also afebrile and hemodynamically stable.

Hb	111 g/l
Platelets	$236 \times 10^9/l$
WBC	$6.8 \times 10^9/l$

Na ⁺	143 mmol/l
K ⁺	5.1 mmol/l
Urea	6.2 mmol/l
Creatinine	102 μ mol/l
CRP	7.8 mg/l

What would be the next step to manage his bacteriuria?

- ☐ This bacteriuria should not be treated. Ensure good hydration and monitor any urinary symptoms or pyrexia
- ☐ Commence nitrofurantoin 100 mg four times a day for 3 days
- ☐ Commence one stat dose of gentamicin intravenously and if no response contact microbiology
- ☐ Check sensitivities first and commence antibiotics regardless of clinic
- ☐ Remove catheter immediately and contact urology

This bacteriuria should not be treated. Ensure good hydration and monitor any urinary symptoms or pyrexia

52%

Commence nitrofurantoin 100 mg four times a day for 3 days

9%

Commence one stat dose of gentamicin intravenously and if no response contact microbiology

6%

Check sensitivities first and commence antibiotics regardless of clinic

12%

Remove catheter immediately and contact urology

21%

Asymptomatic bacteriuria should not be treated except in pregnancy, children younger than 5 years or immunosuppressed patients due to the risk of complications

Important for me Less important

This is a case of an elderly patient with a long-term catheter. Bacteriuria is likely to be contamination and does not require any treatment if patient asymptomatic to prevent increase in antimicrobial resistance. Asymptomatic bacteriuria should not be treated except in pregnancy, children younger than 5 years or immunosuppressed patients due to the risk of complications.

Dr. Assem

A 34-year-old female with a background of HIV present with progressive weakness in her lower limbs. She also states that she is finding it difficult to walk up the stairs and is becoming generally clumsy. She is known to be non compliant with her anti-retroviral therapy. She had no other systemic symptoms such as weight loss and no other past medical history. On examination, one notes power is normal in both upper and lower limbs. However, one notes bilateral dysmetria in the upper limbs and lower limbs. She had an MRI which showed some white matter lesions bilaterally in the parietal lobes. What is the most likely diagnosis?

- ☐ Cerebral vasculitis
- ☐ Cerebral metastasis
- ☐ Multiple sclerosis
- ☐ Progressive multifocal leukoencephalopathy
- ☐ Toxoplasmosis

Cerebral vasculitis	3%
Cerebral metastasis	2%
Multiple sclerosis	4%
Progressive multifocal leukoencephalopathy	76%
Toxoplasmosis	15%

HIV, neuro symptoms, widespread demyelination - progressive multifocal leukoencephalopathy

Important for me Less important

Multiple sclerosis and progressive multifocal leukoencephalopathy lead to white matter lesions on MRI. However, with her background of HIV and being non-compliant with her medication, she is at risk of neuro-complications from being immunocompromised. Therefore progressive multifocal leukoencephalopathy is the more likely diagnosis.

Cerebral metastasis typically presents as ring enhancing lesions on the MRI and one would expect for there to be some other systemic symptoms to suggest malignancy from an unknown primary.

Cerebral vasculitis is a possible diagnosis, however one would expect other symptoms such as a vasculitis rash. One would also expect a past medical history other than HIV which could lead to vasculitis, such as a systemic disease like rheumatoid arthritis or Behcet's disease. MRI normally shows multiple bilateral infarctions, affecting different vascular territories, in various stages of healing,

Toxoplasmosis is a diagnosis to consider in a patient with HIV non-compliant with her medication and presenting with neurological symptoms. However, one would expect ring enhancing lesions on MRI. One would not expect white matter lesions bilaterally in toxoplasmosis.

A 23-year-old man has a Mantoux test prior to receiving the BCG vaccine. He develops a 12 mm indurated lesion on his forearm. Which one of the following cytokines is most involved in this response?

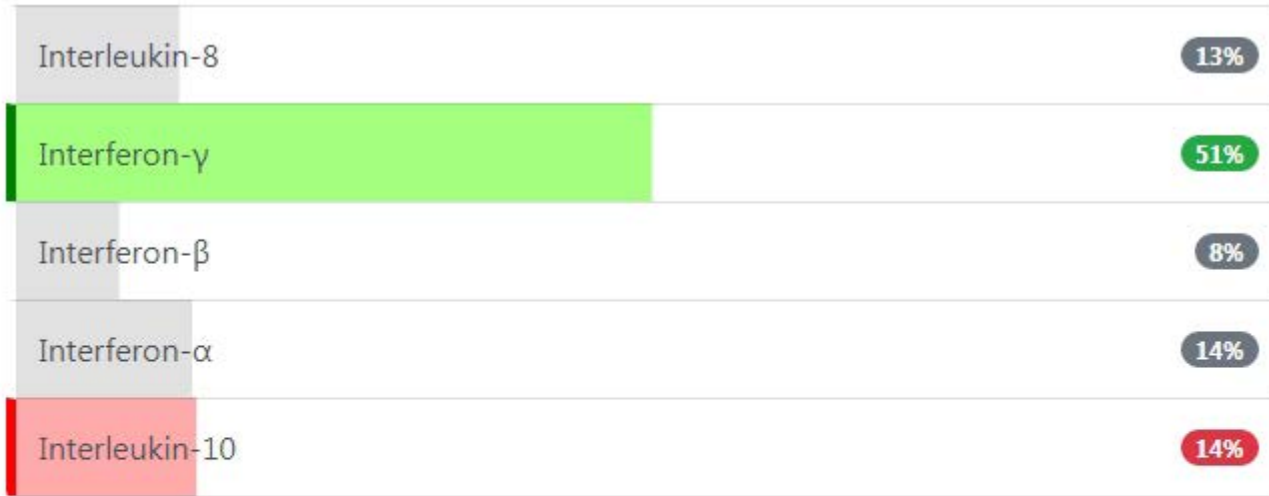
☐ Interleukin-8

☐ Interferon- γ

☐ Interferon- β

☐ Interferon- α

☐ Interleukin-10



Tuberculin skin tests are an example of type IV (delayed) hypersensitivity reactions. These are largely mediated by interferon- γ secreted by T_H1 cells which in turn stimulates macrophage activity.

Following a recent holiday to South America, a 19-year-old woman returned home and within a month developed a swelling around the right cheek with increased fatigue and diarrhoea. Diagnostic thick and thin blood films identified the parasite *Trypanosoma cruzi*. Which medication can be used to treat her condition during the acute phase of the disease?

- ☐ Riluzole
- ☐ Benznidazole
- ☐ Praziquantel
- ☐ Miltefosine
- ☐ Chloroquine

Riluzole	6%
Benznidazole	54%
Praziquantel	27%
Miltefosine	6%
Chloroquine	7%

Benznidazole is used in the acute phase of Chagas' disease to manage the illness

Important for me Less important

Azoles such as benznidazole are antifungal medications which target the p450 cytochrome enzyme system to inhibit the growth of a wide range of organisms.

Riluzole - used to manage motor neurone disease

Praziquantel - used in patients with schistosomiasis

Miltefosine - Used in patients with Leishmaniasis

Chloroquine - Used in the treatment of Malaria

A 23-year-old woman comes for review. She has had recurrent genital warts for the past 4 years which have failed to respond to topical podophyllum. On one occasion she had cryotherapy but will not have it again due to local discomfort. On examination she has a large number of fleshy genital warts around her introitus. What is the most appropriate next step in treatment?

☐ Topical glutaraldehyde

☐ Oral podophyllum

☐ Topical imiquimod

☐ Oral aciclovir

☐ Topical salicylic acid

Topical glutaraldehyde

5%

Oral podophyllum

13%

Topical imiquimod

60%

Oral aciclovir

13%

Topical salicylic acid

10%

A 41-year-old female presents with 3 day history of a dry cough and shortness of breath. This was preceded by flu-like symptoms. On examination there is a symmetrical, erythematous rash with 'target' lesions over the whole body. What is the likely organism causing the symptoms?

- ☐ *Pseudomonas*
- ☐ *Staphylococcus aureus*
- ☐ *Mycoplasma pneumoniae*
- ☐ *Chlamydia pneumoniae*
- ☐ *Legionella pneumophila*

Pseudomonas

3%

Staphylococcus aureus

18%

Mycoplasma pneumoniae

64%

Chlamydia pneumoniae

5%

Legionella pneumophila

10%

Mycoplasma is associated with erythema multiforme

Important for me

Less important

Pneumococcus may also cause erythema multiforme

Which one of the following statements best describes the prevention and treatment of hepatitis C?

- ☐ No vaccine is available and treatment is only successful in around 10-15% of patients
- ☐ No vaccine and no treatment is available
- ☐ A vaccine is available and treatment is successful in around 50% of patients
- ☐ A vaccine is available but no treatment has been shown to be effective
- ☐ No vaccine is available but treatment is successful in the majority of patients

No vaccine is available and treatment is only successful in around 10-15% of patients

21%

No vaccine and no treatment is available

4%

A vaccine is available and treatment is successful in around 50% of patients

11%

A vaccine is available but no treatment has been shown to be effective

5%

No vaccine is available but treatment is successful in the majority of patients

61%

A 19-year-old man presents asking for advice. His girlfriend has recently been diagnosed with meningococcal meningitis. He is worried he may have 'caught it'. What is the recommended antibiotic prophylaxis for close contacts such as this man?

- ☐ Oral co-amoxiclav
- ☐ Oral phenoxymethylpenicillin
- ☐ Oral rifampicin
- ☐ Oral erythromycin
- ☐ Intramuscular cefotaxime

Oral co-amoxiclav	6%
Oral phenoxymethylpenicillin	10%
Oral rifampicin	66%
Oral erythromycin	7%
Intramuscular cefotaxime	10%

The BNF recommends a twice a day dose of rifampicin for two days, based on the patients weight. Please note that if ciprofloxacin is given as a choice this should be picked due to recent changes in HPA guidelines - see below.

A 30-year-old man has just returned to the UK after visiting Kenya. He did not take any anti-malarials during his visit and received multiple mosquito bites. He is pyrexial but stable at present. Malaria is confirmed with a rapid antigen test. You are waiting for the rest of his test results. Which of the following findings would suggest that he should be treated as having severe malaria?

- ☐ Temperature $> 38^{\circ}\text{C}$ after paracetamol
- ☐ Plasmodium vivax species on blood film
- ☐ CRP $> 300\text{ mg/L}$
- ☐ Blood sugar 18 mmol/L
- ☐ Parasitaemia of 6%

Temperature > 38°C after paracetamol	7%
Plasmodium vivax species on blood film	8%
CRP > 300 mg/L	7%
Blood sugar 18 mmol/L	8%
Parasitaemia of 6%	69%

Parasitaemia > 2% is a feature of severe malaria

Important for me Less important

A parasite level of > 2% is diagnostic of severe malaria on UK guidelines. Other criteria include clinical findings (impaired consciousness, respiratory distress, multiple convulsions, shock, jaundice) and laboratory findings (hypoglycaemia, acidosis, raised lactate, acute kidney injury and severe anaemia). The other options are not included in the criteria. The majority of severe forms of malaria are due to *Plasmodium falciparum* but other species can also cause serious complications.

Patients with severe malaria should be treated with IV anti-malarials and HDU or ICU should be considered.

UK malaria treatment guidelines 2016

[http://www.journalofinfection.com/article/S0163-4453\(16\)00047-5/abstract](http://www.journalofinfection.com/article/S0163-4453(16)00047-5/abstract)

A 23-year-old man develops watery diarrhoea 5 days after arriving in Mexico. Which one of the following is the most likely responsible organism?

- ☐ *Salmonella*
- ☐ *Shigella*
- ☐ *Campylobacter*
- ☐ *Escherichia coli*
- ☐ *Bacillus cereus*

Salmonella

9%

Shigella

8%

Campylobacter

14%

Escherichia coli

62%

Bacillus cereus

8%

E. coli is the most common cause of travellers' diarrhoea

Important for me

Less important

Dr Assem

An 18-year-old male who has recently undergone chemotherapy for leukaemia presents with fever, cough, haemoptysis and shortness of breath not responsive to antibiotics. He underwent a chest CT which revealed a 'halo' sign suggestive of invasive aspergillosis. What immune response component is the first line of action against aspergillosis?

- ☐ Cytokines
- ☐ Neutrophils
- ☐ Eosinophils
- ☐ Basophils
- ☐ Macrophages

Cytokines	9%
Neutrophils	9%
Eosinophils	39%
Basophils	5%
Macrophages	39%

Macrophages are the first line immune response, they help to recruit neutrophils which are also crucial components in fighting aspergillosis. This knowledge is relevant as it allows us to understand that patients with deficiencies in macrophages and neutrophils are prone to aspergillosis. In healthy individuals when aspergillosis spores are inhaled, mucociliary clearance is initiated and spores are phagocytosed, clearing the infection.

A raised level of eosinophils are found in allergic bronchopulmonary aspergillosis but their role is later in the process after deposition of the immune complexes. Cytokines are important in cell signalling but do not directly fight the disease process, they are released by macrophages, lymphocytes, mast cells and other immune components. Basophils are involved in response to allergic diseases like asthma and anaphylaxis but are not the first line in aspergillosis.

Invasive Aspergillosis

Seen in the immunocompromised host to include patients with a chronic granulomatous disease, patients undergoing chemotherapy and patients receiving a bone marrow transplant.

Presentation - Pulmonary symptoms are most common, presenting with a cough, fever, haemoptysis (which can be severe), dyspnoea and pleuritic chest pain but may be atypical. There is haematogenous spread to other organs, most commonly bone resulting in osteomyelitis.

Investigations - can be hard to diagnose. Chest X-ray may show consolidation, nodules, infiltrates, or cavitating lesions. Chest CT may show the 'halo' sign (however aspergillosis in patients with chronic granulomatous disease typically does not produce this sign). Cultures can be obtained from sputum, broncho-alveolar lavage, lung tissue via trans-thoracic percutaneous biopsy. In addition, there is an assay to detect Galactomannan which a component aspergillosis cell wall.

Treatment - is with antifungals. The first line is voriconazole

ref: Centres for disease control website -

<https://www.cdc.gov/fungal/diseases/aspergillosis/treatment.html>

and

king J, Henriët S and Warris A. Aspergillosis in Chronic Granulomatous Disease. Journal of fungi. May 2016.

What is the mechanism of action of the antiviral agent amantadine?

- ☐ Inhibits DNA polymerase
- ☐ Protease inhibitor
- ☐ Nucleoside analogue reverse transcriptase inhibitor
- ☐ Inhibits uncoating of virus in the cell
- ☐ Interferes with the capping of viral mRNA

Inhibits DNA polymerase

10%

Protease inhibitor

9%

Nucleoside analogue reverse transcriptase inhibitor

23%

Inhibits uncoating of virus in the cell

41%

Interferes with the capping of viral mRNA

18%

Amantadine - inhibits uncoating (M2 protein) of virus in cell. Also releases dopamine from nerve endings

Important for me [Less important](#)

Which one of the following organisms causes lymphogranuloma venereum?

- ☐ *Haemophilus ducreyi*
- ☐ *Klebsiella granulomatis*
- ☐ Herpes simplex virus
- ☐ *Chlamydia*
- ☐ *Treponema pallidum*

Haemophilus ducreyi

19%

Klebsiella granulomatis

12%

Herpes simplex virus

5%

Chlamydia

52%

Treponema pallidum

12%

Lymphogranuloma venereum - *Chlamydia trachomatis*

Important for me Less important

Dr. Assem

A 19-year-old man presents with a two-day history of a diffuse headache and sore throat. He is pyrexial at 37.8°C and is reluctant to have a fundoscopy due to photophobia. A lumbar puncture is performed:

Serum glucose	5.9 mmol/l
---------------	------------

Lumbar puncture reveals:

Appearance	Clear
Glucose	4.1 mmol/l
Protein	0.3 g/l
White cells	lymphocytes 2 /mm ³ polymorphs 0 /mm ³

What is the most likely diagnosis?

☐ Guillain-Barre syndrome
☐ Viral meningitis
☐ Bacterial meningitis
☐ Cerebral malaria
☐ Normal CSF result

Dr Assem

Condition	Percentage
Guillain-Barre syndrome	4%
Viral meningitis	44%
Bacterial meningitis	5%
Cerebral malaria	3%
Normal CSF result	44%

4%

Viral meningitis

44%

Bacterial meningitis

5%

Cerebral malaria

3%

Normal CSF result

44%

There results are consistent with normal CSF - an alternative diagnosis should be considered

Dr Assem

You are working in the Emergency Department and you see a 22-year-old man with an itchy erythematous rash across his back, shoulders and backs of his arms. The rash appeared yesterday after he started taking an antibiotic, having been unwell for 10 days with general malaise and a sore throat. Which antibiotic is most likely to be the cause?

☐ Flucloxacillin

☐ Phenoxymethylpenicillin

☐ Amoxicillin

☐ Ciprofloxacin

☐ Co-amoxiclav

Flucloxacillin	6%
Phenoxymethylpenicillin	17%
Amoxicillin	62%
Ciprofloxacin	6%
Co-amoxiclav	9%

URTI symptoms + amoxicillin → rash ?glandular fever

Important for me Less important

The correct answer is 3. The patient is likely to have underlying infectious mononucleosis due to Epstein-Barr virus. Amoxicillin is known to commonly produce a widespread erythematous rash in patients with infectious mononucleosis. For this reason, it should not be prescribed to patients with sore throats. Phenoxymethylpenicillin (or penicillin V) is the first line choice for bacterial tonsillitis instead. The patient's rash could also be an urticarial rash due to an allergy to an antibiotic, but there is nothing to guide you as to which antibiotic he is most likely to be allergic to.

BNF:

<https://bnf.nice.org.uk/drug/amoxicillin.html>

Dr Assem

What is the most appropriate antibiotic to use in cholera?

☐ Erythromycin

☐ Metronidazole

☐ Doxycycline

☐ Penicillin V

☐ Trimethoprim

Erythromycin

14%

Metronidazole

24%

Doxycycline

48%

Penicillin V

9%

Trimethoprim

6%

Dr. A. Sem

A 33-year-old is investigated for lethargy. The full blood count is reported as follows:

Hb	10.1 g/dl
Plt	$156 \times 10^9/l$
WBC	$3.7 \times 10^9/l$

His daughter was unwell one week previously with a pyrexial illness associated with a red rash on her cheeks. What is the most likely cause?

- ☐ Measles
- ☐ Coxsackie a16
- ☐ Group A haemolytic streptococci
- ☐ Parvovirus B19
- ☐ HHV-6 (Human Herpesvirus-6)

Measles

12%

Coxsackie a16

7%

Group A haemolytic streptococci

10%

Parvovirus B19

65%

HHV-6 (Human Herpesvirus-6)

7%

A 19-year-old man presents with a 12-hour history of a headache and fever. On examination, you elicit neck stiffness, photophobia and a positive Kernig's sign. He scores 15 on the Glasgow Coma Scale (GCS) and there has been no change in behaviour and there is no evidence of raised intracranial pressure. He is haemodynamically stable and there is no rash.

Blood cultures are taken and a lumbar puncture is performed. You decide to treat empirically for bacterial meningitis and prescribe intravenous cefotaxime every 6 hours.

Which of the following is most appropriate in addition to intravenous cefotaxime?

- ☐ Give intravenous aciclovir
- ☐ Give intravenous dexamethasone with the first antibiotic dose and continue every 6 hours
- ☐ Give intravenous dexamethasone with the first antibiotic dose only
- ☐ Await the cerebrospinal fluid results and prescribe intravenous dexamethasone only if *Streptococcus pneumoniae* is isolated
- ☐ Give intravenous amoxicillin

Give intravenous aciclovir			18%
Give intravenous dexamethasone with the first antibiotic dose and continue every 6 hours			38%
Give intravenous dexamethasone with the first antibiotic dose only			24%
Await the cerebrospinal fluid results and prescribe intravenous dexamethasone only if	<i>Streptococcus pneumoniae</i>	is isolated	10%
Give intravenous amoxicillin			11%

Corticosteroids (dexamethasone) should be given as an adjunct to prevent neurological sequelae

Important for me Less important

1: Aciclovir should be given if herpes simplex encephalitis is suspected, based on reduced consciousness or change in behaviour or cognition. These features are not present and so aciclovir is not indicated.

2: This is the correct answer. Intravenous dexamethasone should be given prior to or with the first dose of antibiotic to reduce the risk of neurological sequelae by reducing cerebrospinal inflammation. If pneumococcal meningitis is suspected or confirmed from clinical features, cerebrospinal fluid parameters or culture results, then dexamethasone should be continued for 4 days. It should be stopped if another causative organism is strongly suspected or confirmed.

3: Dexamethasone should be continued until investigation results suggest an alternative organism to *Streptococcus pneumoniae*.

4: Dexamethasone should be given with the first dose of antibiotic to reduce the risk of neurological sequelae.

5: Amoxicillin is recommended in addition to cefotaxime in the empirical treatment of patients <3 months old or >50 years old.

Which of the following types of viral meningitis may be characteristically associated with a low cerebrospinal fluid glucose level?

☐ Mumps

☐ Cytomegalovirus

☐ Measles

☐ HIV

☐ Echovirus

Mumps

35%

Cytomegalovirus

26%

Measles

16%

HIV

14%

Echovirus

9%

Mumps meningitis is associated with a low CSF glucose

Important for me Less important

Mumps meningitis is associated with a low glucose in up to a third of patients

A 24-year-old gentleman presents with a worsening headache to the emergency department. He emigrated from Sudan two weeks ago. He has had a cough for six weeks. His GP did a tuberculin skin test which was found to be negative and has not responded to oral antibiotics. He has no medical history and takes no regular medications. Blood tests demonstrate positive HIV serology but cryptococcal antigen is negative and other tests are normal. Toxoplasmosis serology is negative. CT demonstrates a single 3cm lesion and meningeal enhancement but no other abnormalities. What is the most likely organism that is responsible for his headache?

- ☐ Toxoplasma gondii
- ☐ Cryptococcus neoformans
- ☐ Cytomegalovirus
- ☐ Mycobacterium tuberculosis
- ☐ JC virus

Toxoplasma gondii	16%
Cryptococcus neoformans	16%
Cytomegalovirus	17%
Mycobacterium tuberculosis	31%
JC virus	20%

The correct answer is Mycobacterium tuberculosis. This young patient has a headache in the context of untreated HIV and therefore likely has a low CD4 count making him vulnerable to HIV neurological complications. He also has a chronic cough with a significant history of time in Sudan, making him at high risk of TB. Meningeal enhancement on the CT also increases the suspicion of TB. In immunosuppression, the tuberculin skin test is unreliable and therefore does not exclude TB. Cryptococcal infection is unlikely with a negative antigen test. Toxoplasmosis is possible but the lack of confusion and drowsiness and the lack of any neurological deficit makes it less likely, especially when considering the negative serology. The absence of fever and confusion makes CMV encephalitis unlikely. Progressive multifocal leukoencephalopathy shows widespread demyelination.

Source:

Leonard, John M. 'Central Nervous System Tuberculosis.' UpToDate. N.p., 04 Jan. 2017.

A 25-year-old student with an anaphylactic allergy to egg protein is planning to travel in South East Asia. Which of the following vaccinations is contraindicated in egg allergy?

- ☐ Yellow fever vaccine
- ☐ Typhoid vaccine
- ☐ Inactivated polio vaccine
- ☐ Japanese encephalitis vaccine
- ☐ Rabies vaccine

Yellow fever vaccine	51%
Typhoid vaccine	13%
Inactivated polio vaccine	14%
Japanese encephalitis vaccine	14%
Rabies vaccine	8%

Egg protein is present in clinically significant quantities in the yellow fever vaccine.

Egg embryos are also used in the production of the MMR and some rabies vaccines. The egg protein content is not clinically significant, however, as it is in the range of picograms to nanograms per dose.

Egg protein is present in potentially significant amounts in killed injected and live attenuated influenza vaccines. It is not present in recombinant influenza vaccine.

Anaphylaxis to egg protein is also a contraindication to the use of propofol.

A 30-year-old man comes for review. He returned from a holiday in Egypt yesterday. For the past two days he has been passing frequent bloody diarrhoea associated with crampy abdominal pain. Abdominal examination demonstrates diffuse lower abdominal tenderness but there is no guarding or rigidity. His temperature is 37.5°C. What is the most likely causative organism?

- ☐ Giardiasis
- ☐ Enterotoxigenic *Escherichia coli*
- ☐ *Staphylococcus aureus*
- ☐ *Salmonella*
- ☐ *Shigella*



Enterotoxigenic *Escherichia coli* infections do not usually cause bloody diarrhoea. A differential diagnosis would be amoebic dysentery, enterohemorrhagic *Escherichia coli* and possibly *Campylobacter*.

A prison GP is bitten by a patient who is known to have hepatitis B. The GP has a documented full history of hepatitis B vaccination and was known to be a responder. What is the most appropriate action to reduce the chance of contracting hepatitis B?

- ☐ Admit for intravenous interferon
- ☐ Give hepatitis B immune globulin
- ☐ Give hepatitis B immune globulin + hepatitis B vaccine booster
- ☐ Give hepatitis B vaccine booster
- ☐ Give oral ribavirin for 4 weeks

Admit for intravenous interferon

3%

Give hepatitis B immune globulin

21%

Give hepatitis B immune globulin + hepatitis B vaccine booster

33%

Give hepatitis B vaccine booster

38%

Give oral ribavirin for 4 weeks

5%

A 45-year-old man is diagnosed as having primary syphilis. Six hours after receiving his first injection of benzylpenicillin he complains of feeling generally unwell. On examination he appears flushed. His blood pressure is 94/62 mmHg, pulse 96/min and temperature 37.9°. These symptoms settle after around four hours. Which one of the following is most likely to explain this finding.

- ☐ Arunan-Leadbetter reaction
- ☐ Jarisch-Herxheimer reaction
- ☐ Concurrent infectious mononucleosis infection
- ☐ Allergic reaction to benzylpenicillin
- ☐ Undiagnosed tertiary syphilis

Arunan-Leadbetter reaction

3%

Jarisch-Herxheimer reaction

83%

Concurrent infectious mononucleosis infection

4%

Allergic reaction to benzylpenicillin

8%

Undiagnosed tertiary syphilis

2%

A 43-year-old woman who is a recent immigrant from Mozambique is referred to the dermatology outpatient clinic. She has developed a number of hypopigmented, oval shaped lesions on her body which are associated with reduced sensation. These are mainly located on the extensor surfaces of her limbs. She has no past medical history of note other than suffering from malaria as a child. What is the most likely diagnosis?

- ☐ HIV
- ☐ Chagas disease
- ☐ Pityriasis versicolor
- ☐ Tuberculosis
- ☐ Leprosy



A 63-year-old man presents to the acute receiving ward with a two-week history of a cough, fever, night sweats, weight loss and diarrhoea. He has tender hepatomegaly on examination. His past medical history includes HIV and his recent CD4 count is less than 50. A blood culture reveals mycobacterium avium complex. What is the treatment for this condition?

- ☐ Rifampicin + Ethambutol
- ☐ Pentamidine
- ☐ Rifampicin + Isoniazid + Pyrazinamide
- ☐ Rifampicin + Ethambutol + Clarithromycin
- ☐ Rifampicin + Isoniazid + Pyrazinamide + Ethambutol

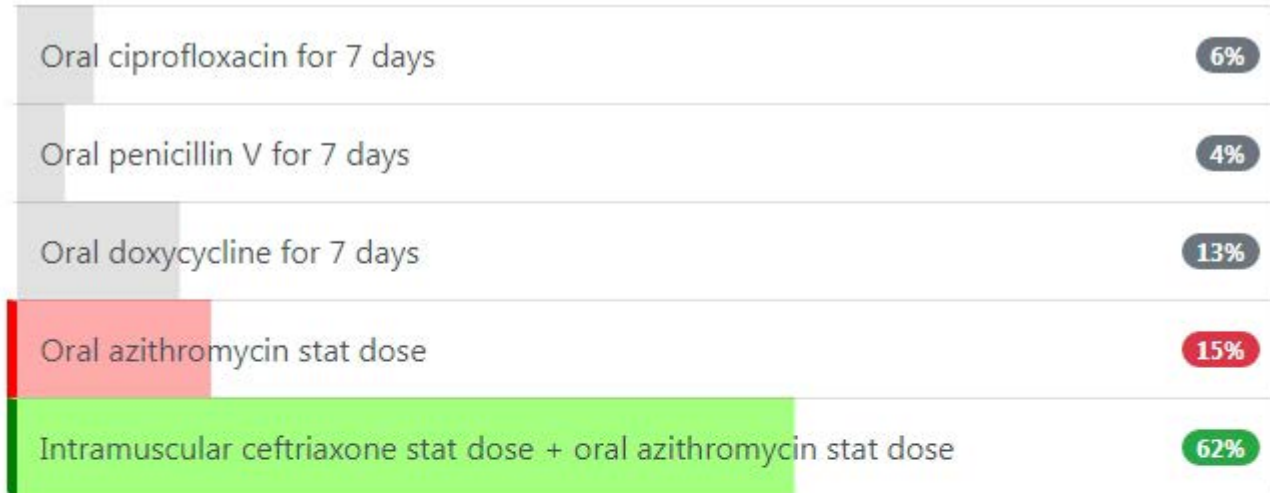
Rifampicin + Ethambutol	7%
Pentamidine	9%
Rifampicin + Isoniazid + Pyrazinamide	10%
Rifampicin + Ethambutol + Clarithromycin	43%
Rifampicin + Isoniazid + Pyrazinamide + Ethambutol	31%

A minimum of two drugs should be given: clarithromycin plus ethambutol. In severe disease, rifabutin can be added. This is recommended due to fewer side-effects than rifampicin however rifampicin is still widely used as the third drug in severe disease due to its cheaper cost. Azithromycin can be also substituted for clarithromycin in severe disease. ref: oxford handbook of tropical medicine.

Mycobacterium avium complex and mycobacterium tuberculosis can present similarly, however mycobacterium avium complex can result in marked hepatomegaly, whereas mycobacterium tuberculosis usually results in focal lesions in the liver. ref: Radin DR. Intraabdominal Mycobacterium tuberculosis vs Mycobacterium avium-intracellulare infections in patients with AIDS: distinction based on CT findings. AJR Am J Roentgenol. 1991 Mar;156(3):487-91.

A 23-year-old male presents with a purulent urethral discharge. A sample of the discharge is shown to be a Gram negative diplococcus. What is the most appropriate antimicrobial therapy?

- ☐ Oral ciprofloxacin for 7 days
- ☐ Oral penicillin V for 7 days
- ☐ Oral doxycycline for 7 days
- ☐ Oral azithromycin stat dose
- ☐ Intramuscular ceftriaxone stat dose + oral azithromycin stat dose



Intramuscular ceftriaxone + oral azithromycin is the treatment of choice for
Gonorrhoea

Important for me Less important

Ciprofloxacin should only be used if the organism is known to be sensitive due to increasing resistance. Penicillin, previously first-line treatment, is rarely used now due to widespread resistance.

A 52-year-old male is admitted to hospital with a temperature of 38.2 C and a 3 days history of a productive cough. He has been generally unwell for the past 10 days with flu-like symptoms. On examination blood pressure is 96/60 mmHg and the heart rate is 102 / min. Chest x-ray shows bilateral lower zone consolidation. What is the most likely causative organism?

- ☐ *Moraxella catarrhalis*
- ☐ *Mycoplasma pneumoniae*
- ☐ *Klebsiella*
- ☐ *Staphylococcus aureus*
- ☐ *Chlamydia pneumoniae*

Moraxella catarrhalis

8%

Mycoplasma pneumoniae

27%

Klebsiella

7%

Staphylococcus aureus

54%

Chlamydia pneumoniae

5%

Preceding influenza predisposes to *Staphylococcus aureus* pneumonia

Important for me

Less important

Dr. Assem

A 33-year-old woman who was diagnosed as having HIV-1 two years ago is reviewed in clinic. She is fit and well currently and has no symptoms of note. The only medication she takes is the occasional paracetamol for tension headaches. Her latest blood tests are as follows:

CD4	$325 \times 10^6/l$
-----	---------------------

What is the most appropriate action with regard with to anti-retroviral therapy?

- ☐ Wait until the CD4 count is below $200 \times 10^6/l$
- ☐ Wait until the CD4 count is above $350 \times 10^6/l$
- ☐ Wait until the CD4 count is below $250 \times 10^6/l$
- ☐ Start antiretroviral therapy now
- ☐ Wait until the CD4 count is below $300 \times 10^6/l$

Wait until the CD4 count is below 200 * 10

6

/1

3%

Wait until the CD4 count is above 350 * 10

6

/1

2%

Wait until the CD4 count is below 250 * 10

6

/1

3%

Start antiretroviral therapy now

90%

Wait until the CD4 count is below 300 * 10

6

/1

2%

A 31-year-old woman who is 26 weeks pregnant presents with a rash. The rash is located just under her axilla and has been getting progressively larger since it first appeared five days. She also reports feeling 'flu-like' and having some joint pains. She has recently returned from a weekend away in Hampshire. Her pregnancy is uncomplicated to date and there is no other significant medical history of note. On examination a large erythematous rash is noted as above. In the middle a central punctum is seen. Given the likely diagnosis, what is the most appropriate treatment?

- ☐ Topical miconazole
- ☐ Oral doxycycline
- ☐ Oral amoxicillin
- ☐ Oral fluconazole
- ☐ Oral erythromycin

Topical miconazole	10%
Oral doxycycline	23%
Oral amoxicillin	35%
Oral fluconazole	7%
Oral erythromycin	25%

Amoxicillin is an alternative to treat early Lyme disease if doxycycline is contraindicated such as in pregnancy

Important for me Less important

This lady has Lyme disease. Doxycycline is therefore contraindicated and amoxicillin should be given instead. A fungal rash would not cause the systemic symptoms.

The most appropriate treatment for cutaneous larva migrans is:

☐ Thiabendazole

☐ Sulfadoxine

☐ Pyrimethamine

☐ Metronidazole

☐ Dapsone

Thiabendazole

53%

Sulfadoxine

7%

Pyrimethamine

18%

Metronidazole

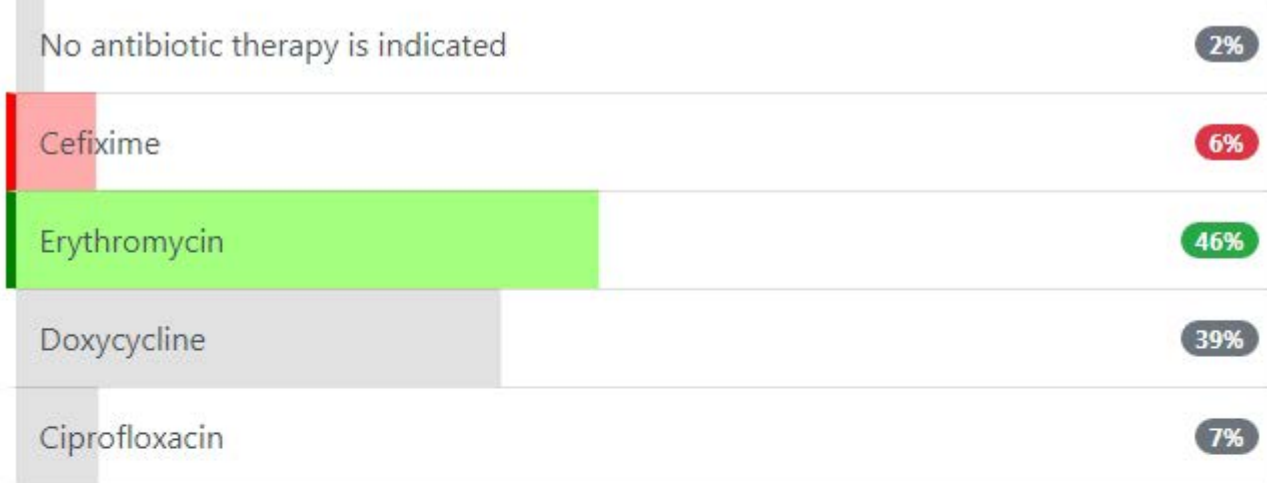
8%

Dapsone

14%

A 27-year-old pregnant woman is found to have *Chlamydia*. She reports being allergic to penicillin. What is the most appropriate treatment?

- ☐ No antibiotic therapy is indicated
- ☐ Cefixime
- ☐ Erythromycin
- ☐ Doxycycline
- ☐ Ciprofloxacin



Azithromycin, erythromycin or amoxicillin may be used to treat *Chlamydia* in pregnancy

Important for me Less important

NICE Clinical Knowledge Summaries recommends azithromycin, erythromycin or amoxicillin for pregnant women who have *Chlamydia*.

The efficacy of amoxicillin, often assumed to be ineffective against *Chlamydia*, was supported in a recent Cochrane review. A test of cure should be carried out following treatment.

A man presents with severe vomiting. He reports not being able to keep fluids down for the past 12 hours. You suspect a diagnosis of gastroenteritis and on discussing possible causes he mentions reheating curry with rice the night before. What is the most likely causative organism?

☐ *Escherichia coli*

☐ *Campylobacter*

☐ *Salmonella*

☐ *Shigella*

☐ *Bacillus cereus*

Escherichia coli

5%

Campylobacter

5%

Salmonella

6%

Shigella

3%

Bacillus cereus

82%

Bacillus cereus characteristically occurs after eating rice that has been reheated

Important for me Less important

Bacillus cereus infection most commonly results from reheated rice.

Dr Assem

Which one of the following best describes the action of aciclovir?

- ☐ Inhibits uncoating of virus in the cell
- ☐ Inhibits DNA polymerase
- ☐ Interferes with the capping of viral mRNA
- ☐ Inhibits RNA polymerase
- ☐ Protease inhibitor

Inhibits uncoating of virus in the cell

7%

Inhibits DNA polymerase

51%

Interferes with the capping of viral mRNA

14%

Inhibits RNA polymerase

20%

Protease inhibitor

7%

Aciclovir - guanosine analog, phosphorylated by thymidine kinase which in turn inhibits the viral DNA polymerase

Important for me Less important

A patient with a severe headache, nausea and vomiting comes to the emergency department. Examination reveals neck stiffness and a positive Kernig's sign. A lumbar puncture is performed and the CSF is purulent. She is urgently started on ceftriaxone. Which class of antibiotics does ceftriaxone belong to?

- ☐ Macrolides
- ☐ Tetracyclines
- ☐ Aminoglycosides
- ☐ Beta-lactams
- ☐ Lincosamides



Cephalosporins are a type of beta-lactam

Important for me Less important

Ceftriaxone is a cephalosporin, which is a subset of beta-lactams. Beta-lactams also include penicillins and carbapenems. Cephalosporins are incredibly potent antibiotics and are usually reserved for very severe conditions (e.g. meningitis, as in this scenario).

A 43-year-old sheep farmer presents with a lesion on his right hand. It initially started as a small, raised, red papule but has now become larger. On examination a 2cm, flat-topped haemorrhagic lesion is seen. What is the most likely diagnosis?

- ☐ Orf
- ☐ Staphylococcal furuncle
- ☐ Hand, foot and mouth disease
- ☐ Paronychia
- ☐ Anthrax

Orf

58%

Staphylococcal furuncle

8%

Hand, foot and mouth disease

6%

Paronychia

4%

Anthrax

24%

Dr. Arsem

A 39-year-old man with HIV is admitted due to shortness of breath. Chest x-ray shows bilateral pulmonary infiltrates and *Pneumocystis carinii* pneumonia is suspected. What type of staining should be applied to the bronchoalveolar lavage to demonstrate the organism?

- ☐ Rubeanic acid
- ☐ Silver stain
- ☐ Pearl's stain
- ☐ Rose Bengal
- ☐ Congo red

Rubeanic acid

4%

Silver stain

61%

Pearl's stain

16%

Rose Bengal

9%

Congo red

11%

A tearful 35-year-old pregnant lady reports that her husband has recently told her he has chlamydia. She is currently at 36 weeks gestation and is requesting treatment for chlamydia. What (if anything) should you give her?

- ☐ Azithromycin 1 g single dose
- ☐ Reassure her that if her results come back negative then she does not need treatment
- ☐ Doxycycline 100mg BD for 7 days
- ☐ Ceftriaxone 500 mg intramuscular (IM) injection
- ☐ Gentamicin 3mg/kg

Azithromycin 1 g single dose

51%

Reassure her that if her results come back negative then she does not need treatment

17%

Doxycycline 100mg BD for 7 days

10%

Ceftriaxone 500 mg intramuscular (IM) injection

17%

Gentamicin 3mg/kg

4%

Azithromycin, erythromycin or amoxicillin may be used to treat *Chlamydia* in pregnancy

Important for me Less important

All chlamydia contacts are offered treatment. Prompt treatment in this patient is essential as she is due to give birth soon and if the chlamydia is untreated she risks passing it on to her baby.

Dr. Assam

Which one of the following statements regarding hepatitis B is correct?

- ☐ Ribavirin is the treatment of choice for chronic hepatitis B
- ☐ All patient immunised against hepatitis B require an anti-HBs check to assess their response to the vaccine
- ☐ 10-15% of adults fail to respond or respond poorly to 3 doses of the vaccine
- ☐ The vaccine is of the live-attenuated type
- ☐ An anti-HBs level of 20 mIU/ml indicates an adequate response to the vaccine

Ribavirin is the treatment of choice for chronic hepatitis B

8%

All patient immunised against hepatitis B require an anti-HBs check to assess their response to the vaccine

37%

10-15% of adults fail to respond or respond poorly to 3 doses of the vaccine

39%

The vaccine is of the live-attenuated type

7%

An anti-HBs level of 20 mIU/ml indicates an adequate response to the vaccine

8%

Only those at risk of occupational exposure (i.e. Healthcare workers) and patients with chronic kidney disease require an anti-HBs check.

A 35-year-old male presents with a facial droop. On neurological examination, a lower motor neuron facial nerve lesion is localised. He describes a rash over his forearm 3 weeks ago which settled. What is the most likely diagnosis?

- ☐ Lyme disease
- ☐ Stroke
- ☐ Motor neuron disease
- ☐ Multiple sclerosis
- ☐ Ramsay Hunt syndrome

Lyme disease	67%
Stroke	2%
Motor neuron disease	2%
Multiple sclerosis	2%
Ramsay Hunt syndrome	27%

This patient has a lower motor facial nerve lesion. One must next consider all the causes of a facial nerve palsy. Considering the history of a rash (erythema migrans), Lyme disease is the most likely answer. The symptoms of Lyme disease most often occurs 3 days to 1 month after the initial tick bite. A stroke and multiple sclerosis affects the central nervous system and present with a upper motor neuron lesion as opposed to a lower motor neuron lesion. Motor neuron disease doesn't normally affect the facial nerve and never presents with a rash. Ramsay Hunt syndrome typically presents with a triad of ipsilateral facial paralysis (lower motor neuron facial palsy), ear pain, and a vesicular rash on the face or in the ear. The rash doesn't appear on the forearm.

A 72-year-old woman who is known to have type 2 diabetes mellitus and heart failure is reviewed. One week ago she was treated with oral flucloxacillin and penicillin V for a right lower limb cellulitis. Unfortunately there has been no response to treatment. What is the most appropriate next line antibiotic?

☐ Co-amoxiclav

☐ Erythromycin

☐ Clindamycin

☐ Vancomycin

☐ Gentamicin

Co-amoxiclav

12%

Erythromycin

8%

Clindamycin

45%

Vancomycin

27%

Gentamicin

8%

A 30-year-old woman presents with a white, malodorous vaginal discharge. There is no associated itch or dyspareunia. A diagnosis of bacterial vaginosis is suspected.

Overgrowth of which one of the following organisms is most likely to cause this presentation?

- ☐ *Lactobacilli*
- ☐ *Trichomonas*
- ☐ *Candida*
- ☐ *Mycoplasma hominis*
- ☐ *Gardnerella*

Lactobacilli

19%

Trichomonas

19%

Candida

7%

Mycoplasma hominis

4%

Gardnerella

51%

Bacterial vaginosis - overgrowth of predominately *Gardnerella vaginalis*

Important for me

Less important

A 38-year-old man presents to the genitourinary clinic with multiple, painless genital ulcers. A diagnosis of granuloma inguinale is made. What is the causative organism?

☐ *Klebsiella granulomatis*

☐ *Chlamydia*

☐ Herpes simplex virus

☐ *Treponema pallidum*

☐ *Haemophilus ducreyi*

Klebsiella granulomatis

39%

Chlamydia

14%

Herpes simplex virus

7%

Treponema pallidum

19%

Haemophilus ducreyi

22%

Granuloma inguinale - *Klebsiella granulomatis*

Important for me Less important

A 25-year-old man returns from a gap-year in Central and South America and presents with a 2 month history of an ulcerating lesion on his lower lip. Examination of his nasal and oral mucosae reveals widespread involvement. What is the likely cause?

☐ *Leishmania brasiliensis*

☐ *Leishmania mexicana*

☐ *Trypanosoma cruzi*

☐ Basal cell carcinoma

☐ *Leishmania donovani*

Leishmania brasiliensis

48%

Leishmania mexicana

17%

Trypanosoma cruzi

13%

Basal cell carcinoma

4%

Leishmania donovani

18%

Mucocutaneous ulceration following travel? - *Leishmania brasiliensis*

Important for me Less important

This patient most likely has leishmaniasis. The pattern of a primary skin lesion with mucosal involvement is characteristic of *Leishmania brasiliensis*

Which of the following antibiotics is predominately bactericidal?

- ☐ Trimethoprim
- ☐ Erythromycin
- ☐ Ciprofloxacin
- ☐ Chloramphenicol
- ☐ Minocycline

Trimethoprim

15%

Erythromycin

13%

Ciprofloxacin

41%

Chloramphenicol

25%

Minocycline

7%

A 25-year-old man with a history of epilepsy presents for advice regarding malarial prophylaxis. Next month he plans to travel to Vietnam. His trip will take him to some of the coastal tourist destinations but he also plans to travel inland. What is the most appropriate medication to prevent him developing malaria?

☐ Quinine

☐ Atovaquone + proguanil

☐ Mefloquine

☐ Primaquine

☐ Pyrimethamine + sulfadoxine

Quinine

12%

Atovaquone + proguanil

38%

Mefloquine

20%

Primaquine

21%

Pyrimethamine + sulfadoxine

9%

In certain parts of South-East Asia there is widespread chloroquine resistance. Chemoprophylaxis using atovaquone + proguanil (Malarone), mefloquine (Lariam) or doxycycline is therefore recommended. Mefloquine should be avoided in this patient due to his history of epilepsy.

A 38-year-old man who has recently emigrated from eastern Europe presents to Emergency Department one hour after sustaining a 4 cm laceration to the dorsum of his left hand. He works as a builder and sustained the laceration after cutting into a cardboard box using a Stanley knife.

On examining the wound there is no sign of a foreign body or neurovascular deficit. He is referred to Plastics for apposition of the wound.

You ask him about his tetanus vaccination status. He has 'no idea' but can remember getting some vaccinations as a child.

What is the most appropriate action with respect to tetanus?

- ☐ Requires human tetanus immunoglobulin + tetanus vaccine + complete vaccine course at a later date
- ☐ Requires tetanus vaccine + complete vaccine course at a later date
- ☐ Requires human tetanus immunoglobulin
- ☐ No action required
- ☐ Requires tetanus vaccine + oral penicillin V prophylaxis for one week

Requires human tetanus immunoglobulin + tetanus vaccine + complete vaccine course at a later date

42%

Requires tetanus vaccine + complete vaccine course at a later date

28%

Requires human tetanus immunoglobulin

11%

No action required

6%

Requires tetanus vaccine + oral penicillin V prophylaxis for one week

12%

This wound is not high risk for tetanus. The Greenbook would however recommend that we vaccinate against tetanus in this situation. His immunisation status is unknown and it is therefore prudent to reduce his risk of developing tetanus in future by ensuring he has a complete course of tetanus vaccination.

A 29-year-old Russian man who has recently arrived into the country presents with fever and feeling generally unwell. His temperature is 38.2°C and pulse 96/min. On examination a grey coating is seen surrounding the tonsils and there is extensive cervical lymphadenopathy. What is the most likely diagnosis?

☐ Dengue fever

☐ Typhoid

☐ Paratyphoid

☐ Actinomycosis

☐ Diphtheria



A 62-year-old patient with type 2 diabetes mellitus presents with a 'rash' on his left shin. This has grown in size over the past two days and is now a painful, hot, erythematous area on his anterior left shin spreading around to the back of the leg. He is systemically well and a decision is made to give oral treatment. He has a past history of penicillin allergy. What is the most appropriate antibiotic to give?

- ☐ Ciprofloxacin
- ☐ Cefaclor
- ☐ Flucloxacillin
- ☐ Vancomycin
- ☐ Clarithromycin



A 43-year-old Asian man presents with headache and neck stiffness. CT brain is normal and a lumbar puncture is performed with the following results

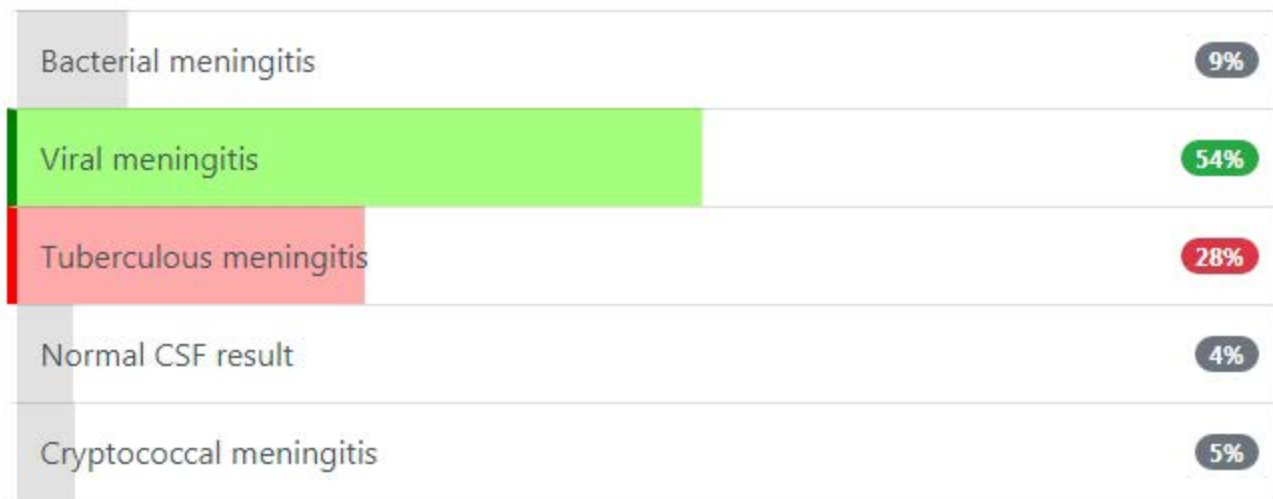
Serum glucose	4.7 mmol/l
---------------	------------

Lumbar puncture reveals:

Opening pressure	15 cmCSF
Appearance	Cloudy
Glucose	3.3 mmol/l
Protein	0.7 g/l
White cells	100 / mm ³ (70% lymphocytes)

What is the most likely diagnosis?

- ☐ Bacterial meningitis
- ☐ Viral meningitis
- ☐ Tuberculous meningitis
- ☐ Normal CSF result
- ☐ Cryptococcal meningitis



The CSF lymphocytosis combined with a glucose greater than half the serum level points towards a viral meningitis. TB meningitis is associated with a low CSF glucose

Which one of the following is a Gram positive coccus?

- ☐ *Enterococcus faecalis*
- ☐ *Moraxella catarrhalis*
- ☐ *Haemophilus influenzae*
- ☐ *Neisseria meningitidis*
- ☐ *Bacillus anthracis*

Enterococcus faecalis

56%

Moraxella catarrhalis

16%

Haemophilus influenzae

10%

Neisseria meningitidis

8%

Bacillus anthracis

10%

Enterococci - Gram-positive cocci

Important for me Less important

A 39-year-old man presents with shortness of breath following one week of flu-like symptoms. He also has a non-productive cough but no chest pain. A chest x-ray shows bilateral consolidation and examination reveals erythematous lesions on his limbs and trunk. Which one of the following investigations is most likely to be diagnostic?

- ☐ Cold agglutins
- ☐ Sputum culture
- ☐ Urinary antigen for Legionella
- ☐ Serology for Mycoplasma
- ☐ Blood culture

Cold agglutins

14%

Sputum culture

7%

Urinary antigen for Legionella

19%

Serology for Mycoplasma

53%

Blood culture

6%

Mycoplasma? - serology is diagnostic

Important for me Less important

The flu-like symptoms, bilateral consolidation and erythema multiforme point to a diagnosis of Mycoplasma. The most appropriate diagnostic test is Mycoplasma serology

A newly qualified staff nurse at the local hospital undergoes vaccination against hepatitis B. The following results are obtained three months after completion of the primary course:

Result	Anti-HBs: 10 - 100 mIU/ml
Reference	An antibody level of >100 mIU/ml indicates a good immune response with protective immunity

What is the most appropriate course of action?

- ☐ Repeat course (i.e. 3 doses) of hepatitis B vaccine
- ☐ Repeat anti-HBs level in three months time
- ☐ Give a course of hepatitis B immune globulin (HBIG) + one further dose of hepatitis B vaccine
- ☐ Give one further dose of hepatitis B vaccine
- ☐ Do a HIV test

Repeat course (i.e. 3 doses) of hepatitis B vaccine

19%

Repeat anti-HBs level in three months time

9%

Give a course of hepatitis B immune globulin (HBIG) + one further dose of hepatitis B vaccine

11%

Give one further dose of hepatitis B vaccine

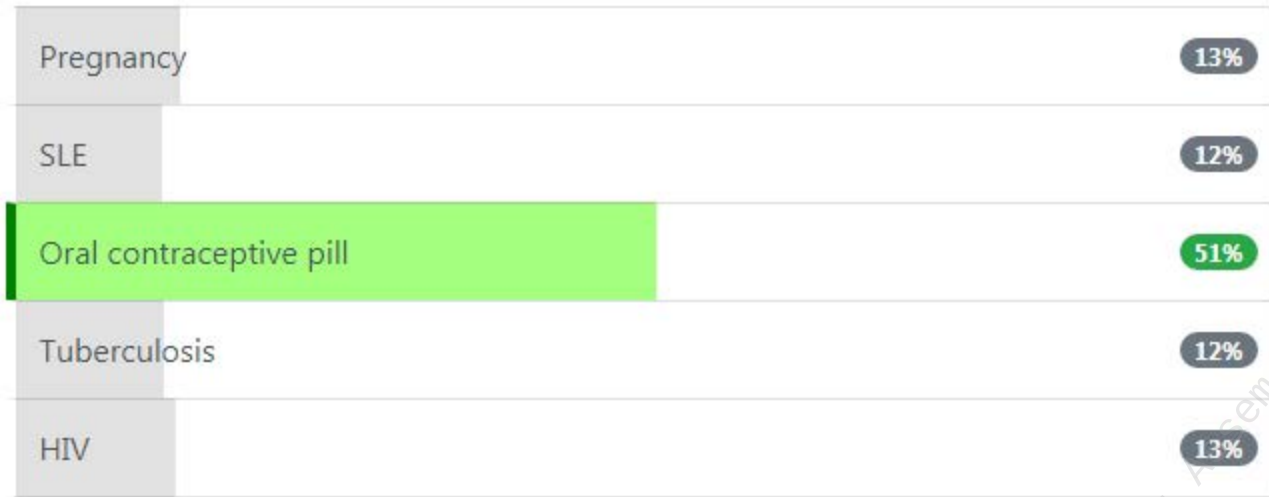
56%

Do a HIV test

5%

Which of the following is least recognised as a cause of a false positive VDRL test?

- ☐ Pregnancy
- ☐ SLE
- ☐ Oral contraceptive pill
- ☐ Tuberculosis
- ☐ HIV



A 54-year-old homosexual man presents to the emergency department with fever and malaise 24 hours after being treated for syphilis with intramuscular benzathine penicillin in his local GUM clinic. He has a florid maculopapular rash over his arms, legs and torso which he tells you has been present for the last 2 weeks. The patient informs you he has no sexual contacts for the last 2 months and his last HIV test was performed 3 days ago when he tested positive for syphilis and was negative. Observations are normal and there are no other findings on systemic examination.

What would be the most appropriate response to this presentation?

- ☐ Repeat HIV test, viral load and CD4 count
- ☐ Admit for CT head, lumbar puncture and observation
- ☐ Reassure the patient and discharge him
- ☐ Repeat syphilis serology and repeat treatment if this is positive
- ☐ Refer to dermatology for outpatient biopsy

Repeat HIV test, viral load and CD4 count

24%

Admit for CT head, lumbar puncture and observation

9%

Reassure the patient and discharge him

49%

Repeat syphilis serology and repeat treatment if this is positive

12%

Refer to dermatology for outpatient biopsy

6%

The Jarisch-Herxheimer reaction is a known phenomenon following syphilis treatment that does not require any specific treatment or investigations

Important for me Less important

A flu-like reaction, known as the Jarisch-Herxheimer reaction, is a known phenomenon following syphilis treatment with Benzathine penicillin that is usually self limiting to 24-48 hours that it is important to inform patients about prior to treatment. As examination was normal and there is no history of neurological symptoms there is no need to investigate for neurosyphilis. Syphilis serology will very likely still be positive 1 day after treatment and there is no indication to repeat this.

37 years old American man came to your clinic with a history of fever, arthralgia and headache one week before the onset of a red itchy area at the site of previous tick bite on his left forearm. On examination of the area, it appears to be oval and slightly raised erythema. Serology confirms Lyme disease. You started the patient on doxycycline cap 100 mg PO once daily.

Two days later the patient was brought by his brother to the emergency department gasping his breath and immediately died of cardiac arrest.

What was the most likely cause of his sudden death?

- ☐ Sepsis
- ☐ Heart block
- ☐ Meningoencephalitis
- ☐ Myocarditis
- ☐ Doxycycline side effect

Sepsis

4%

Heart block

58%

Meningoencephalitis

6%

Myocarditis

26%

Doxycycline side effect

5%

Heart block is an important cause of death in Lyme disease

Important for me [Less important](#)

Lyme disease should be suspected in endemic areas like United state patients with erythema chronicum migrants.

Heart block is one of the most serious presentations of Lyme disease that can cause cardiac arrest.

Sepsis, meningoencephalitis and myocarditis are unlikely to cause sudden death.

Doxycycline has no proarrhythmic side effects.

Dr Assem

A 44-year-old homosexual man presents to your GUM clinic with a 3-day history of diarrhoea. He has no history of recent foreign travel and is normally fit and well. His abdomen is soft, non tender and he has normal observations. His last sexual encounter was 2 weeks ago. Tests for *Chlamydia trachomatis*, *Neisseria gonorrhoea*, HIV and Syphilis are negative. A stool sample is sent for culture and grows *Shigella*.

What is the most suitable management plan?

- ☐ Start loperamide and review in 48 hours
- ☐ Admit to the local infectious diseases unit for IV Metronidazole
- ☐ Reassure the patient this is a commensal bacteria unlikely to be the cause of their symptoms
- ☐ Advise the patient to increase their fluid intake and seek medical attention if they become unwell, or develop bloody diarrhoea.
- ☐ Inform Public Health England

Start loperamide and review in 48 hours

6%

Admit to the local infectious diseases unit for IV Metronidazole

18%

Reassure the patient this is a commensal bacteria unlikely to be the cause of their symptoms

5%

Advise the patient to increase their fluid intake and seek medical attention if they become unwell, or develop bloody diarrhoea.

59%

Inform Public Health England

13%

Shigella infection is usually self limiting and does not require antibiotic treatment; antibiotics are indicated for people with severe disease, who are immunocompromised or with bloody diarrhoea

Important for me [Less important](#)

Shigella infection is usually self-limiting and does not require antibiotic treatment; antibiotics are indicated for people with severe disease, who are immunocompromised or with bloody diarrhoea. This patient sounds fairly well; hospital admission would be inappropriate and *Shigella* is only notifiable if food poisoning is suspected. Antimotility drugs are not recommended in infective diarrhoea

A 25-year-old man is bitten by his assailant during a fight outside a nightclub. Alongside *Streptococci spp.* and *Staphylococcus aureus*, which of the following organisms is most likely to be isolated?

☐ *Pseudomonas aeruginosa*

☐ *Eikenella corrodens*

☐ *Neisseria gonorrhoeae*

☐ *Acinetobacter baumannii*

☐ *Enterococcus faecalis*

Pseudomonas aeruginosa

12%

Eikenella corrodens

47%

Neisseria gonorrhoeae

4%

Acinetobacter baumannii

17%

Enterococcus faecalis

20%

Eikenella is notable as a cause of infections following human bites

Important for me Less important

Eikenella corrodens is found in around 10-30% of human bite wounds.

Dr Assem

Which one of the following organisms causes erysipelas?

- ☐ *Staphylococcus aureus*
- ☐ *Streptococcus pneumoniae*
- ☐ *Staphylococcus epidermidis*
- ☐ *Streptococcus pyogenes*
- ☐ *Streptococcus viridans*

Staphylococcus aureus

16%

Streptococcus pneumoniae

4%

Staphylococcus epidermidis

18%

Streptococcus pyogenes

55%

Streptococcus viridans

7%

A 23-year-old student returns from India and develops a febrile illness. Following investigation he is diagnosed as having *Plasmodium vivax* malaria. This area is known to harbour chloroquine-resistant strains of *Plasmodium vivax*. What is the most appropriate initial management to treat the acute infection?

- ☐ Primaquine
- ☐ Atovaquone-proguanil
- ☐ Quinine
- ☐ Doxycycline
- ☐ Artemether-lumefantrine

Primaquine	15%
Atovaquone-proguanil	17%
Quinine	5%
Doxycycline	5%
Artemether-lumefantrine	58%

Non-falciparum malaria (acute infection) , treatment of choice: artemisinin-based combination therapy (ACT) or chloroquine

Important for me Less important

For non-falciparum malaria:

- in areas which are known to be chloroquine-sensitive then WHO recommend either an artemisinin-based combination therapy (ACT) or chloroquine
- in areas which are known to be chloroquine-resistant an ACT should be

What is the mechanism of action of the antiviral agent ribavirin?

Inhibits DNA polymerase	13%
Inhibits uncoating of virus in the cell	11%
Protease inhibitor	19%
Nucleoside analogue reverse transcriptase inhibitor	19%
Interferes with the capping of viral mRNA	37%

Inhibits DNA polymerase

13%

Inhibits uncoating of virus in the cell

11%

Protease inhibitor

19%

Nucleoside analogue reverse transcriptase inhibitor

19%

Interferes with the capping of viral mRNA

37%

Ribavirin - guanosine analog which inhibits inosine monophosphate (IMP) dehydrogenase, interferes with the capping of viral mRNA

Important for me Less important

A 23-year-old presents 3 weeks after a hiking trip in the Scottish Highlands. This morning whilst eating breakfast he noticed that the left side of his face was not moving. He reports feeling generally unwell for the past couple of weeks with muscle pains, fever and lethargy. For the past couple of days, he has suffered from palpitations and noted a ring-like rash with a central redness over his chest. He is diagnosed with disseminated Lyme disease.

What is the most appropriate treatment?

- ☐ Oral co-amoxiclav
- ☐ Oral amoxicillin
- ☐ Intravenous amoxicillin
- ☐ Intravenous ceftriaxone
- ☐ Intravenous teicoplanin

Oral co-amoxiclav	9%
Oral amoxicillin	11%
Intravenous amoxicillin	20%
Intravenous ceftriaxone	50%
Intravenous teicoplanin	9%

IV ceftriaxone should be used as first-line treatment of Lyme disease with disseminated or central nervous system involvement

Important for me Less important

Intravenous ceftriaxone is the antibiotic of choice in disseminated Lyme disease with oral doxycycline being used in early disease. The European version of Lyme disease can be associated with facial nerve palsy with otherwise non-specific symptoms, resulting in an incorrect diagnosis of Bells Palsy (Cooper et al). Studies suggest that between 3.5 and 10% of patients with Lyme disease go on to develop a facial nerve palsy and this should be considered as a differential in patients presenting with unilateral facial weakness.

This patient is a hiker and has likely been bitten by a tick during his recent trip. His initial symptoms of muscle ache and fever are typical of the early/localised disease. As the condition progresses patients develop disseminated disease and can present with erythema chronicum migrans or 'bull's-eye' rash, bells palsy, palpitations, dizziness or symptoms of meningism.

Oral co-amoxiclav is not used in the treatment of disseminated Lyme disease.

Oral amoxicillin can be used in early disease where doxycycline is contraindicated, however, would not be appropriate in this case.

Intravenous ceftriaxone is the first choice antibiotic not intravenous amoxicillin.

Intravenous teicoplanin would not be the first-line treatment in this patient.

Reference:

Cooper L, Branagan-Harris M, Tuson R, Nduka C. Lyme disease and Bell's palsy: an epidemiological study of diagnosis and risk in England. Br J Gen Pract 2017; 67 (658): e329-e335.

A 22-year-old woman presents with lethargy, pyrexia and headaches. She is a student and returned from a holiday in Ibiza ten days ago. These symptoms have been present for the past six days and she is wondering whether she may need an antibiotic. She also has a history of menorrhagia and is concerned that she may be anaemic. Clinical examination reveals a temperature of 37.9°C and marked cervical lymphadenopathy. You order a full blood count which is reported as follows:

Hb	12.1 g/dl
Platelets	189 * 10 ⁹ /l
WCC	13.1 * 10 ⁹ /l
Neutrophils	5.2 * 10 ⁹ /l
Lymphocytes	6.2 * 10 ⁹ /l
Film	Atypical lymphocytes seen

What is the most likely diagnosis?

- ☐ Acute lymphoblastic leukaemia
- ☐ Hashimoto's thyroiditis
- ☐ Infectious mononucleosis
- ☐ HIV seroconversion
- ☐ Septicaemia secondary to streptococcal throat infection

Acute lymphoblastic leukaemia

6%

Hashimoto's thyroiditis

2%

Infectious mononucleosis

77%

HIV seroconversion

12%

Septicaemia secondary to streptococcal throat infection

3%

Atypical lymphocytes - ?glandular fever

Important for me

Less important

A 19-year-old student is brought to the Emergency Department by friends due to a severe headache and drowsiness. On examination he has a widespread purpuric rash. Meningococcal infection is strongly suspected but he is known to be penicillin allergic (previous anaphylaxis). What is the antibiotic of choice?

☐ Chloramphenicol

☐ Meropenem

☐ Teicoplanin

☐ Erythromycin

☐ Ciprofloxacin

Chloramphenicol

44%

Meropenem

12%

Teicoplanin

8%

Erythromycin

15%

Ciprofloxacin

21%

A 40-year-old woman who is known to be HIV positive is admitted to the Emergency Department following a seizure. Her partner reports that she has been having headaches, night sweats and a poor appetite for the past four weeks. Blood tests and a CT head are arranged:

CD4	89 u/l
CT head	Single homogenously-enhancing lesion in the right parietal lobe

What is the most likely diagnosis?

- ☐ Primary CNS lymphoma
- ☐ Tuberculosis
- ☐ Progressive multifocal leukoencephalopathy
- ☐ *Cryptococcus*
- ☐ Toxoplasmosis

Primary CNS lymphoma	63%
Tuberculosis	15%
Progressive multifocal leukoencephalopathy	7%
<i>Cryptococcus</i>	5%
Toxoplasmosis	10%

HIV, neuro symptoms, single brain lesions with homogenous enhancement - CNS lymphoma

Important for me Less important

This is a difficult question. Toxoplasmosis is the most common cause of brain lesions in HIV patients. However, around 80% of toxoplasmosis cases involve multiple lesions and the history is suggestive of lymphoma. Cerebral tuberculosis is much less common than lymphoma in HIV.

Dr. Arsem

Which one of the following is least likely to result from *Streptococcus pyogenes* infection?

- ☐ Rheumatic fever
- ☐ Scarlet fever
- ☐ Cellulitis
- ☐ Type 2 necrotizing fasciitis
- ☐ Pneumonia

Rheumatic fever

12%

Scarlet fever

15%

Cellulitis

9%

Type 2 necrotizing fasciitis

12%

Pneumonia

52%

Streptococcus pyogenes rarely causes pneumonia.

Dr Assem

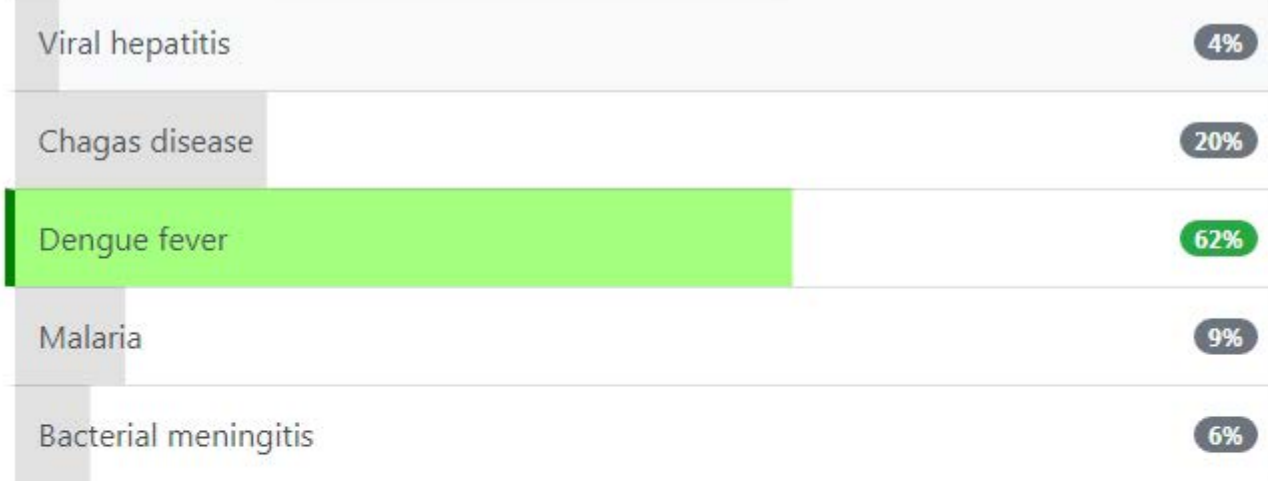
A 19-year-old man presents 3 days after returning from a backpacking trip across Brazil. He complains of a sudden onset fever, headache, joint pains and rash all over his body. He has no existing health conditions and is not on any medication.

On examination he has a petechial rash on his limbs. He has no focal neurology and no signs of meningism.

Hb	100 g/l
Platelets	$80 \times 10^9/l$
WBC	$4.0 \times 10^9/l$
Eosinophils	$0.4 \times 10^9/l$

What is the most likely diagnosis?

- ☐ Viral hepatitis
- ☐ Chagas disease
- ☐ Dengue fever
- ☐ Malaria
- ☐ Bacterial meningitis



Dengue fever is found in South America (as well as South East Asia) and presents like this with sudden onset fever and arthralgia combined with low platelets and haemorrhage in the case of Dengue haemorrhagic fever. Chagas disease (American trypanosomiasis) is also found in this area but would usually present with mild features and you would expect to see raised eosinophils. Viral hepatitis and malaria are less likely to present with a petechial rash. Bacterial meningitis is unlikely as there are no signs of meningism.

A 35-year-old homosexual man is referred to the local genitourinary clinic following the development of a solitary painless penile ulcer associated with painful inguinal lymphadenopathy. He has recently developed rectal pain and tenesmus. What is the most likely diagnosis?

☐ Herpes simplex infection

☐ Syphilis

☐ Granuloma inguinale

☐ Chancroid

☐ Lymphogranuloma venereum

Herpes simplex infection	4%
Syphilis	11%
Granuloma inguinale	10%
Chancroid	10%
Lymphogranuloma venereum	65%

Genital ulcers

- painful: herpes much more common than chancroid
- painless: syphilis more common than lymphogranuloma venereum

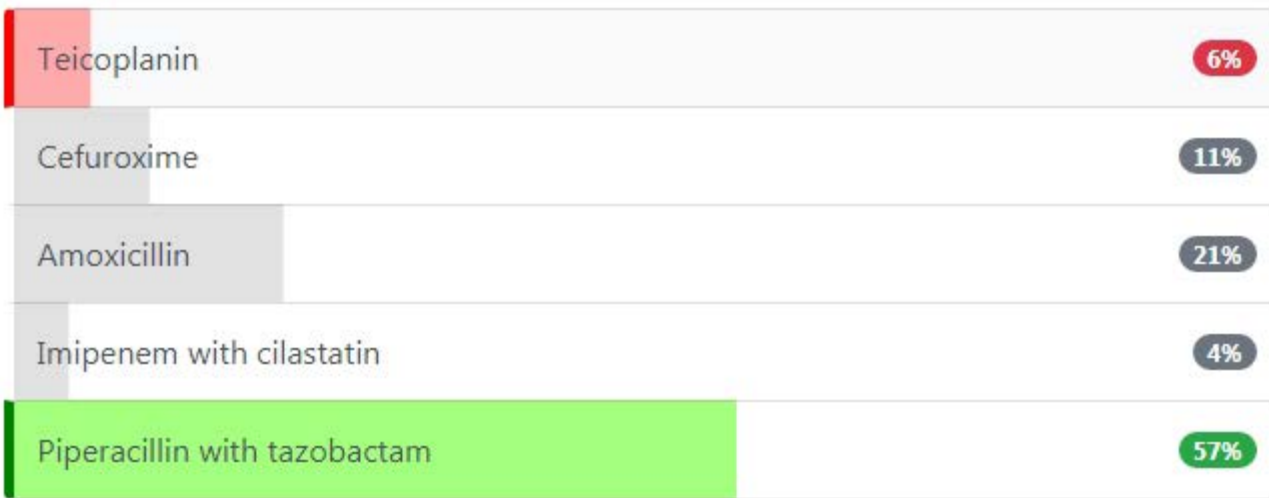
Important for me Less important

Lymphogranuloma venereum usually involves three stages:

- 1 - small painless pustule which later forms an ulcer
- 2 - painful inguinal lymphadenopathy
- 3 - proctocolitis

A 55-year-old man who was admitted following a stroke two weeks ago is reviewed. Yesterday he started to have a temperature and become more confused. A septic screen has shown radiological evidence of pneumonia. On examination his respiratory rate is 36/min, pulse 112/min, oxygen saturations of 95% on room air and blood pressure of 102/66 mmHg. What is the most appropriate antibiotic to use?

- ☐ Teicoplanin
- ☐ Cefuroxime
- ☐ Amoxicillin
- ☐ Imipenem with cilastatin
- ☐ Piperacillin with tazobactam



Cefuroxime is a second generation cephalosporin and is therefore a poor choice as it has limited action against Gram-negative bacteria.

Dr. Arsem

Which one of the following statements is true regarding *Listeria monocytogenes*?

- ☐ Multiplies rapidly at high temperatures
- ☐ The organism is resistant to ampicillin
- ☐ It is a Gram negative bacillus
- ☐ It is diagnosed by the presence of urinary antigen
- ☐ May cause ataxia

Multiplies rapidly at high temperatures

15%

The organism is resistant to ampicillin

9%

It is a Gram negative bacillus

19%

It is diagnosed by the presence of urinary antigen

21%

May cause ataxia

36%

A 35-year-old man returns from a two week holiday in Italy. He has a 10 day history of rectal bleeding associated with lower back pain. On examination there is a painful swelling of his right knee. What is the most likely diagnosis?

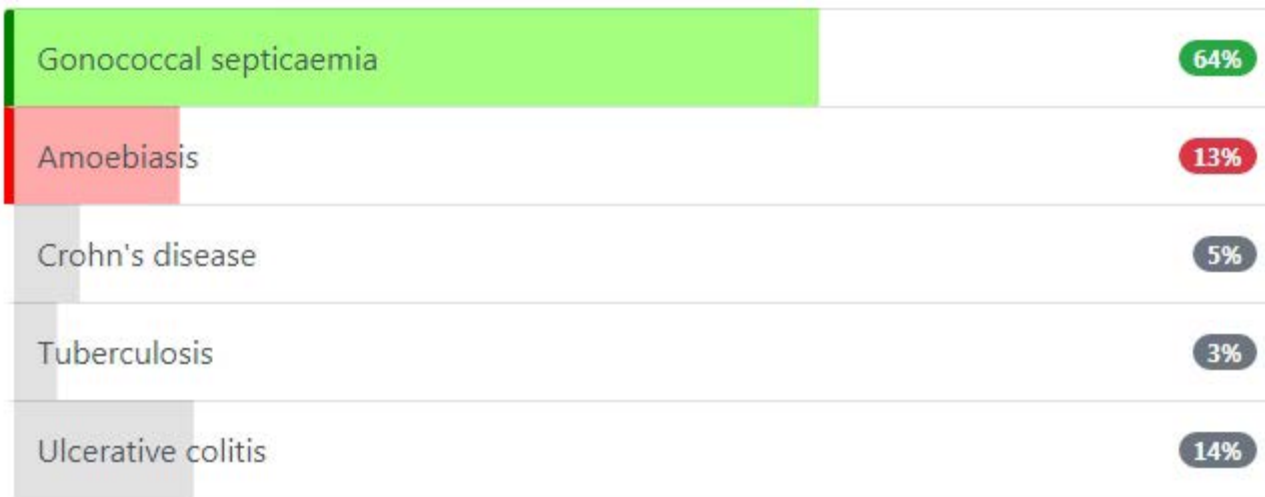
☐ Gonococcal septicaemia

☐ Amoebiasis

☐ Crohn's disease

☐ Tuberculosis

☐ Ulcerative colitis



Gonococcus contracted via anal sex may cause proctitis. The knee swelling seen in this patient is septic arthritis, which is characteristic of the second stage of disseminated gonococcal infection. Proctitis may present with either lower back or rectal pain

A 23-year-old medical student is seen in a genitourinary medicine clinic for a painless lesion on the glans of his penis. He describes a 2-week history of the lesion that started as a small erythematous papule and has now progressed to ulceration. This was associated with fevers, sweats and general malaise. He has returned from his elective in the Caribbean and admits to an episode of unprotected sex with a local resident.

On examination there was a 1x2cm painless ulcer on the glans of his penis. You note groove sign with lymphadenopathy above and below the left inguinal ligament only.

What organism is cause of the patients presentation?

- ☐ Treponema pallidum
- ☐ Chlamydia trachomatis
- ☐ Haemophilus ducreyi
- ☐ Klebsiella
- ☐ Gonorrhoea

Treponema pallidum	37%
Chlamydia trachomatis	34%
Haemophilus ducreyi	19%
Klebsiella	6%
Gonorrhoea	5%

Lymphogranuloma venereum - *Chlamydia trachomatis*

Important for me Less important

This patient is presenting with the classic features of Lymphogranuloma venereum (LGV). This tropical sexually transmitted disease can be caused by multiple serovars of *Chlamydia Trachomatis*. The bacterium gains entry through breaches in the epithelial/mucous membranes, travelling through the lymphatics via macrophages to local nodes. It is endemic to Africa, India, Caribbean, central America and southeast Asia.

The disease presents in two stages:

Primary stage: Self-limiting painless genital ulcer at the site of inoculation 3-12 days later.

Secondary stage: Presents 1-6 months later with unilateral painful lymphadenitis/lymphangitis. The site of inoculation dictates symptomatology, if rectally, then tenesmus, proctocolitis, strictures and fistulas can ensue. Cervicitis and urethritis are also common features. Enlarged lymph nodes are known as buboes, they are often painful and can lead to thinning of the overlying skin causing abscesses. Groove sign is separation inguinal nodes by the inguinal ligament and is characteristic of the disease.

Diagnosis is achieved by enzyme linked immunoassays or polymerase chain reaction of infected sample areas/pus. Acute and convalescent sera can be used, but requires two samples 2 weeks apart.

Treatment involves antibiotics, either doxycycline or macrolides (azithromycin or erythromycin) and potential surgical drainage/aspiration of the buboes or abscesses.

Complications of the disease include: genital elephantiasis, hepatitis, infertility, pelvic inflammatory disease, arthritis and fitz hugh curtis syndrome.

A 58-year-old caucasian male originally from the United Kingdom (UK) now living in East Africa has returned to the UK on holiday. He has become unwell in the last two days, complaining of a headache, rigors, vomiting, fever, abdominal pain and passing little amounts of dark red urine. On examination, there is hepatosplenomegaly, jaundice and anaemia. Urinalysis reveals blood only and microscopy showed no red cells. Of the following options, what is the most likely diagnosis?

- ☐ Leptospirosis
- ☐ Acute viral hepatitis
- ☐ Pyelonephritis
- ☐ Schistosomiasis
- ☐ Blackwater fever

Leptospirosis	15%
Acute viral hepatitis	4%
Pyelonephritis	3%
Schistosomiasis	23%
Blackwater fever	56%

Blackwater fever is a rare complication of malaria which can be fatal. It is caused by large intravascular haemolysis resulting in haemoglobinuria, anaemia, jaundice and acute kidney injury. Urine is classically black or dark red in colour. The cause of the massive haemolysis is unknown. The treatment is with antimalarials, intravenous fluids and in some cases dialysis. Urinalysis reveals blood which is not seen on microscopy as it is haemoglobinuria.

Schistosomiasis has an acute onset which includes symptoms of fever, chills, headache and fatigue but symptoms of haematuria do not come till the chronic phase as a result of bladder fibrosis and calcification, this presents more insidiously. In addition, in schistosomiasis, urine microscopy would show red cell casts. Acute hepatitis is a consideration but normally results in a prodromal phase of flu-like symptoms lasting 1-6 weeks before jaundice appears and would not usually cause oliguria. Severe leptospirosis, known as Weil's disease, can result in renal failure and jaundice but also tends to cause pulmonary haemorrhage and shows signs of bleeding. Furthermore, there is usually a relevant occupational history resulting in exposure to infected rat urine. Pyelonephritis would cause leucocytes and nitrates to be positive on urinalysis and would not cause hepatosplenomegaly.

A 42-year-old female presents to the Emergency Department. She is known to be an intravenous drug user and sometimes practices skin popping. She has multiple sores and wounds. She is complaining of double vision, difficulty swallowing, slurred speech and weakness of the arm muscles. Her arms are weak and floppy. You suspect that a bacterial toxin is causing her symptoms. What is the mechanism of action of the most likely toxin?

- ☐ Chloride channel blocker
- ☐ Inhibition of the release of acetylcholine at synapses
- ☐ Inhibition of the release of glycine and gamma-amino butyric acid at synapses
- ☐ Sodium channel blocker
- ☐ Nicotinic acetylcholine receptor blocker

Chloride channel blocker

4%

Inhibition of the release of acetylcholine at synapses

53%

Inhibition of the release of glycine and gamma-amino butyric acid at synapses

20%

Sodium channel blocker

5%

Nicotinic acetylcholine receptor blocker

18%

Botulinum toxin inhibits the release of acetylcholine at synapses

Important for me Less important

The patient has wound botulism, as characterised by descending flaccid paralysis and cranial nerve signs. Intravenous drug users are at higher risk of botulism, particularly if they engage in skin popping or muscle popping. A patient with tetanus from a wound would present with spasms and stiffness of the muscles rather than flaccid weakness.

Botulinum toxin works by inhibiting the release of acetylcholine at synapses of the nervous system, both peripherally and centrally. Tetanus toxin inhibits the release of inhibitory neurotransmitters (glycine and GABA at synapses). Tetrodotoxin, produced by several fish species including pufferfish, is a sodium channel blocker. Curare, the poison used to tip arrows by the native people of Central and South America, is a nicotinic acetylcholine receptor blocker. Chlorotoxin, from the deathstalker scorpion, is a chloride channel blocker.

Botulinum neurotoxins: mechanism of action

<https://www.ncbi.nlm.nih.gov/pubmed/23201505>

Dr Assem

A 27-year-old student presents to the GP with a 24-hour history of explosive diarrhoea and vomiting. On further questioning, he has not noticed any blood in his stool, has no history of foreign travel. He tells you he has been eating rice kept warm in a rice cooker for several days.

What is the likely pathogenic organism underlying his symptoms?

- ☐ *Bacillus cereus*
- ☐ *Campylobacter jejuni*
- ☐ *Shigella flexneri*
- ☐ Norwalk virus
- ☐ *Staphylococcus aureus*

Bacillus cereus

82%

Campylobacter jejuni

5%

Shigella flexneri

4%

Norwalk virus

3%

Staphylococcus aureus

6%

Bacillus cereus characteristically occurs after eating rice that has been reheated

Important for me Less important

This young gentleman is likely to have toxigenic food poisoning from *Bacillus cereus*. *Bacillus cereus* spores germinate in cooked rice and produce toxin if the cooked product is kept insufficiently chilled. *S. aureus* will also cause a toxigenic food poisoning but the specific history in this case makes this a less likely underlying organism. Equally Norwalk virus can cause explosive diarrhoea and vomiting but is not associated with any specific food stuffs.

Campylobacter and *Shigella* cause bacterial food poisoning and would likely have a longer history with bloody diarrhoea.

Dr Assem

Which one of the following features is not associated with Lyme disease?

☐ Jarisch-Herxheimer reaction

☐ Meningitis

☐ Prolonged PR interval on ECG

☐ Erythema marginatum

☐ Arthralgia



Lyme disease is associated with erythema chronicum migrans

A 44-year-old farmer presents to the Emergency Department due to a high temperature and confusion. On examination his pulse is 124 bpm, blood pressure 84/56 mmHg and temperature 39.8°C. He has a generalised erythematous rash which is starting to desquamate on his palms and is also noted to have a paronychia infection of a fingernail on the left hand. What is the most likely diagnosis?

- ☐ Paraquat overdose
- ☐ Leptospirosis
- ☐ Staphylococcal toxic shock syndrome
- ☐ Disseminated herpes simplex infection
- ☐ Organophosphate poisoning

Paraquat overdose

5%

Leptospirosis

17%

Staphylococcal toxic shock syndrome

68%

Disseminated herpes simplex infection

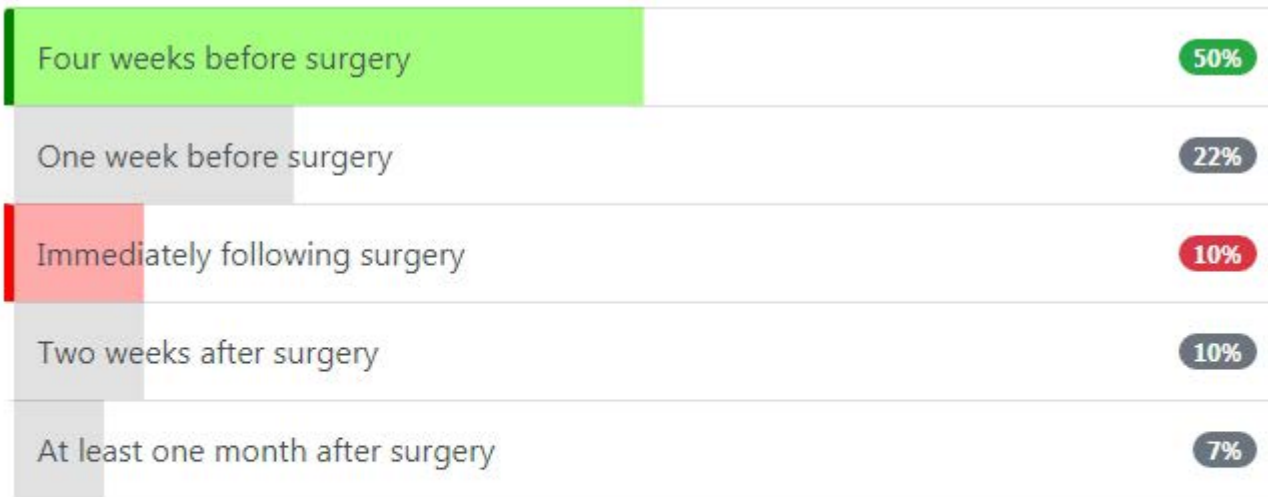
4%

Organophosphate poisoning

6%

For a patient undergoing an elective splenectomy, when is the optimal time to give the pneumococcal vaccine?

- ☐ Four weeks before surgery
- ☐ One week before surgery
- ☐ Immediately following surgery
- ☐ Two weeks after surgery
- ☐ At least one month after surgery



The current British National Formulary recommends giving the vaccine at least 2 weeks before elective splenectomy. Therefore 4 weeks is the best response from the given options.

A 30-year-old man presents to the emergency department 4 weeks after returning from a two-week business trip to India. For the past week he has felt generally unwell with fever and lethargy. Last night he started to pass bloody diarrhoea and have high fevers.

On examination his temperature is 38.2°C, pulse 102/min, blood pressure 104/68 mmHg. Tender hepatomegaly is noted on examination.

Bloods show the following:

Hb	116 g/l
Platelets	269 * 10 ⁹ /l
WBC	13.6 * 10 ⁹ /l
CRP	156 mg/l

Bilirubin	43 µmol/l
ALP	168 u/l
ALT	68 u/l
γGT	205 u/l
Albumin	37 g/l

What is the most likely causative organism/virus?

- ☐ Hepatitis A virus
- ☐ *Plasmodium falciparum*
- ☐ *Entamoeba histolytica*
- ☐ *Giardia lamblia*
- ☐ *Campylobacter jejuni*

Hepatitis A virus	14%
<i>Plasmodium falciparum</i>	9%
<i>Entamoeba histolytica</i>	43%
<i>Giardia lamblia</i>	15%
<i>Campylobacter jejuni</i>	19%

This patient presents with dysentery and hepatomegaly. The unifying diagnosis is amoebiasis with an amoebic liver abscess. A differential diagnosis here would be *Escherichia coli* which can cause both dysentery as well as a pyogenic liver abscess.

Giardia lamblia does not typically cause bloody diarrhoea.

Campylobacter jejuni is not a cause of hepatomegaly.

A 19-year-old medical student undergoes primary immunisation against hepatitis B. His post immunisation bloods are reported as follows:

Anti-HBs	< 10 mIU/ml
----------	-------------

What is the most appropriate course of action?

- ☐ Give one further dose of hepatitis B vaccine
- ☐ Do a HIV test
- ☐ Test for current or past hepatitis B + repeat course (i.e. 3 doses) of vaccine
- ☐ Give two further doses of hepatitis B vaccine
- ☐ Give a course of hepatitis B immune globulin (HBIG) + one further dose of hepatitis B vaccine

Give one further dose of hepatitis B vaccine

21%

Do a HIV test

4%

Test for current or past hepatitis B + repeat course (i.e. 3 doses) of vaccine

51%

Give two further doses of hepatitis B vaccine

16%

Give a course of hepatitis B immune globulin (HBIG) + one further dose of hepatitis B vaccine

9%

A 34-year-old HIV positive man is being treated for *Pneumocystis carinii* pneumonia with co-trimoxazole. Arterial blood gases show a pO₂ of 8.2 kPa. What drug should be added to treatment?

- ☐ Meropenem
- ☐ Chloramphenicol
- ☐ Steroids
- ☐ Nebulised fluconazole
- ☐ Magnesium sulphate

Meropenem

6%

Chloramphenicol

6%

Steroids

74%

Nebulised fluconazole

9%

Magnesium sulphate

5%

A 32-year-old HIV positive man presents to the emergency department with a painful, swollen leg. He has a history of poor adherence with his medication and is currently not taking antiretrovirals; his most recent blood tests from a year previously show a detectable viral load. On examination, there are multiple purplish nodules in the skin overlying the popliteal fossa.

What is the most likely underlying viral cause for his pathology?

- ☐ Epstein Barr Virus
- ☐ Human Herpes Virus 8
- ☐ Human Papilloma Virus
- ☐ Hepatitis B
- ☐ Human T-Lymphotropic Virus

Ebstein Barr Virus	9%
Human Herpes Virus 8	62%
Human Papilloma Virus	10%
Hepatitis B	2%
Human T-Lymphotropic Virus	16%

Kaposi's sarcoma is caused by HHV-8 infection in HIV positive individuals

Important for me Less important

This is a classical presentation of Kaposi's sarcoma, which is caused by HHV8 virus individuals with HIV. It is an example of an AIDS-defining illness.

All of the other options are viral precipitants for other cancers that do not fit the stem.

- Epstein Barr Virus is associated with Hodgkin's lymphoma
- Human Papilloma Virus is associated with cervical cancer in women and throat and anal cancer in men
- Hepatitis B is associated with Hepatocellular carcinoma
- Human T-Lymphotropic Virus is associated with adult T-cell lymphoma

People with poorly controlled HIV are more likely to develop the viral-related cancers listed above; this is partly related to the increased rates of these viral infections in people living with HIV and also relates to the impaired immune function. The development of anti-retroviral drugs has significantly reduced the rates of virus-related cancers in people living with HIV.

A 47-year-old lady is referred by her GP with a two day history of fever and headache. She is normally fit and well and has no past medical history of note. On examination you note nuchal rigidity. Investigations show the following:

Serum glucose	4.9 mmol/l
---------------	------------

Lumbar puncture reveals:

Opening pressure	14 cmCSF
Appearance	Cloudy
Glucose	1.7 mmol/l
Protein	1.9 g/l
White cells	900 / mm ³ (90% polymorphs)

What is the most likely infective agent?

- ☐ *Streptococcus pneumoniae*
- ☐ *E. coli*
- ☐ *Listeria monocytogenes*
- ☐ Enterovirus
- ☐ *Streptococcus pyogenes*

Streptococcus pneumoniae

63%

E. coli

5%

Listeria monocytogenes

15%

Enterovirus

7%

Streptococcus pyogenes

10%

6 years - 60 years age group are at risk from meningitis caused by *Streptococcus pneumoniae*

Important for me Less important

The CSF results are consistent with bacterial meningitis (low glucose, high protein, high polymorphs). In this age group *Streptococcus pneumoniae* and *Neisseria meningitidis* are the most common causes of bacterial meningitis.

A phlebotomist gives herself a needlestick injury whilst taking blood from a patient who is known to be hepatitis B positive. The phlebotomist has just started her job and is in the process of being immunised for hepatitis B but has only had one dose to date. What is the most appropriate action to minimise her risk of contracting hepatitis B from the needle?

- ☐ No action needed, complete hepatitis B vaccination course as normal
- ☐ Give oral ribavirin for 4 weeks
- ☐ Give an accelerated course of the hepatitis B vaccine + hepatitis B immune globulin
- ☐ Give hepatitis B immune globulin + oral ribavirin for 4 weeks
- ☐ Give hepatitis B immune globulin

A phlebotomist gives herself a needlestick injury whilst taking blood from a patient who is known to be hepatitis B positive. The phlebotomist has just started her job and is in the process of being immunised for hepatitis B but has only had one dose to date. What is the most appropriate action to minimise her risk of contracting hepatitis B from the needle?

No action needed, complete hepatitis B vaccination course as normal

6%

Give oral ribavirin for 4 weeks

3%

Give an accelerated course of the hepatitis B vaccine + hepatitis B immune globulin

70%

Give hepatitis B immune globulin + oral ribavirin for 4 weeks

11%

Give hepatitis B immune globulin

9%

A 25-year-old sexually active woman presents with dysuria and urgency. A urine dipstick is positive for leukocytes and nitrites. Urine culture and gram staining reveal a gram-positive organism in clusters that is coagulase-negative.

What is the most likely causative organism?

- ☐ *Escherichia coli*
- ☐ *Staphylococcus aureus*
- ☐ *Staphylococcus saprophyticus*
- ☐ *Proteus mirabilis*
- ☐ *Klebsiella*

<i>Escherichia coli</i>	10%
<i>Staphylococcus aureus</i>	13%
<i>Staphylococcus saprophyticus</i>	64%
<i>Proteus mirabilis</i>	8%
<i>Klebsiella</i>	4%

Staphylococcus saprophyticus can commonly cause UTI in sexually active young women

Important for me Less important

Staphylococcus saprophyticus is the second most common cause of UTIs in sexually active young women (*E. coli* is most common). It is a gram-positive coccus that grows in clusters and is coagulase-negative.

Escherichia coli is a gram-negative bacteria.

Staphylococcus aureus is gram-positive that grows in clusters but is coagulase-positive.

Proteus mirabilis is gram-negative bacilli and is urease-positive.

Klebsiella is a gram-negative bacilli.

All of these bacteria can cause UTIs.

A 27-year-old male presents with malaise, pyrexia, lymphadenopathy and a maculopapular rash. The Monospot test is negative. Given a history of high-risk sexual behaviour you are asked to exclude a HIV seroconversion illness. What is the most appropriate investigation?

- ☐ Antibodies to HIV-2
- ☐ gp120 polymerase chain reaction
- ☐ p24 antigen test
- ☐ CCR5 polymerase chain reaction
- ☐ Antibodies to HIV-1

Antibodies to HIV-2

6%

gp120 polymerase chain reaction

8%

p24 antigen test

67%

CCR5 polymerase chain reaction

9%

Antibodies to HIV-1

10%

A 30-year-old man presents to the acute medical receiving ward, one week after returning from Tanzania. He has developed a high fever, 38.9, which started abruptly, headache and generalised severe joint pain preventing him from walking. You note his finger looks swollen. There is no rash. He has been taking his anti-malarial pills. His blood results are as follows:

Hb	160 g/l
Platelets	$300 \times 10^9/l$
WBC	$6 \times 10^9/l$

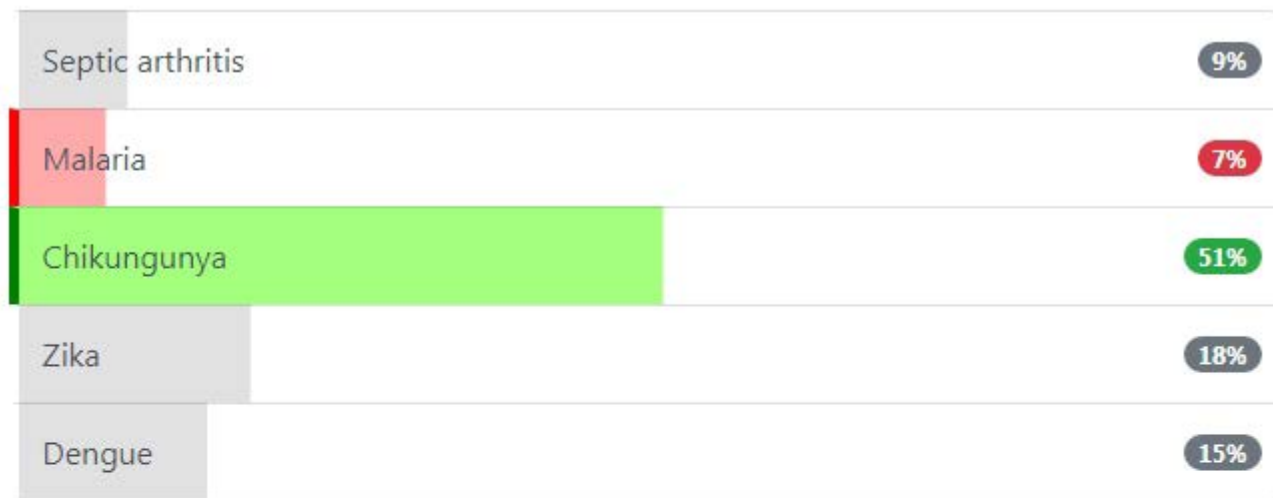
☐ Septic arthritis

☐ Malaria

☐ Chikungunya

☐ Zika

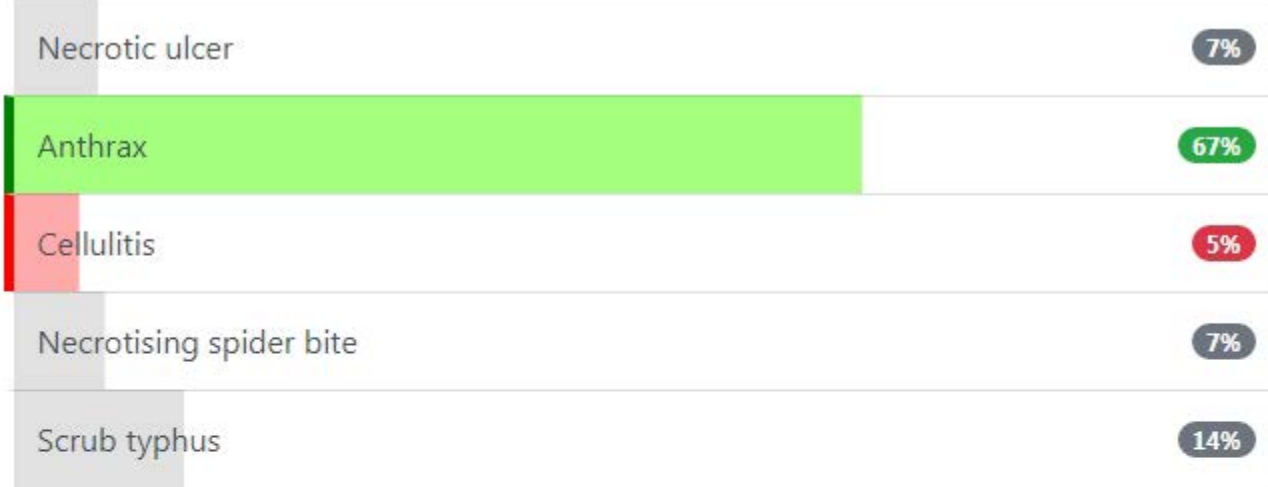
☐ Dengue



Severe joint pain and high fever point to chikungunya after return from Africa. The absence of a rash makes chikungunya more likely than dengue. In addition, a feature which points to chikungunya is the severe joint pain which is often debilitating and normal blood results (with dengue in some cases there are low platelets). Zika is not as common in Africa and tends to produce milder symptoms including low-grade fever (most cases are in South America). Malaria is less likely as he was taking his anti-malarial pills, in addition, joint swelling is not a feature of malaria. Septic arthritis more commonly affects one joint at a time were as this man has generalised severe joint pain.

A 56-year-old farmer presents with a painless black eschar on his cheek with surrounding swelling and mild fever. The eschar started initially as an itchy boil-like lesion which became enlarged. In the last week, he had been visiting rural farms in the Turkey to help with agriculture work. What diagnosis would need to be considered first?

- ☐ Necrotic ulcer
- ☐ Anthrax
- ☐ Cellulitis
- ☐ Necrotising spider bite
- ☐ Scrub typhus



A black eschar with oedema is characteristic of anthrax. There are occasional outbreaks in central Asia and Africa (ref: WHO). The cutaneous form is the most common, caused by handling infected animals resulting in farmers being at risk. In this case, anthrax would need to be considered and ruled out first. Scrub typhus would also give an eschar but would be accompanied by other symptoms such as muscle pain, cough, and GI upset. A necrotic ulcer is unlikely as it does not usually present on the face. There is no history of spider bite making necrotizing spider bite less likely.

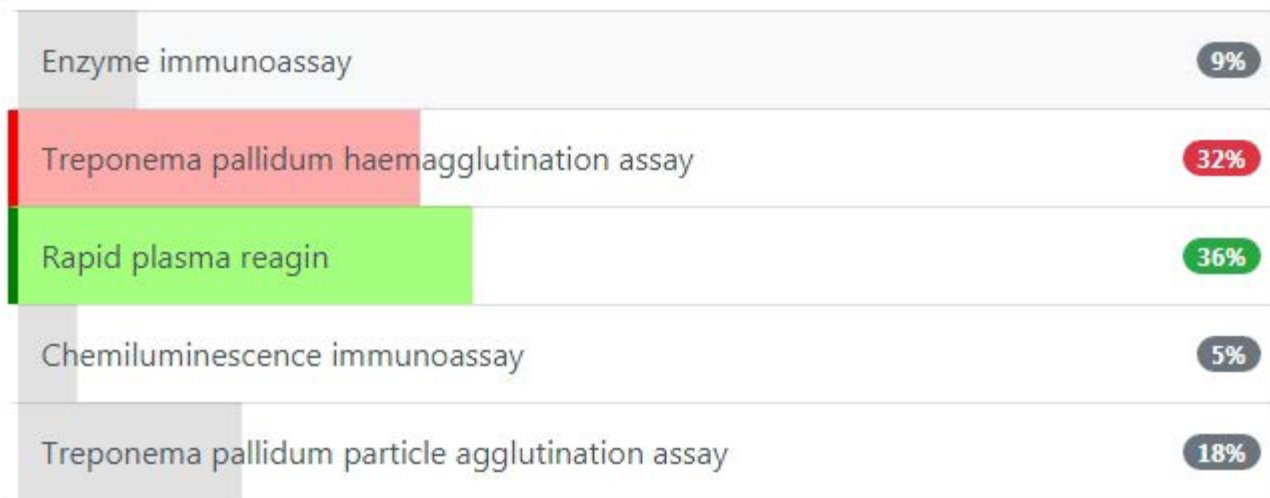
Dr. Arsem

A 42-year-old businessman presents to General Practice after returning from a trip to Thailand, 4 weeks ago, with an ulcer on his penis. He has a prior history of treated syphilis.

On examination, you note a non-painful chancre on the shaft of the penis. There is no penile discharge and no lymphadenopathy is noted.

Which of the following tests are more likely to reflect a repeat infection with *treponema pallidum*?

- ☐ Enzyme immunoassay
- ☐ *Treponema pallidum* haemagglutination assay
- ☐ Rapid plasma reagin
- ☐ Chemiluminescence immunoassay
- ☐ *Treponema pallidum* particle agglutination assay



The answer is the rapid plasma reagin test which is a cardiolipin test which becomes negative after treatment.

The enzyme immunoassay, treponemal pallidum haemagglutination assay, chemiluminescence immunoassay and treponema pallidum particle agglutination assay are all treponemal-specific antibody tests which remain positive after the first infection and would not provide evidence for a repeat infection.

A 19-year-old man presents with dysuria associated with a watery discharge from his urethral meatus. A urethral swab shows non-specific urethritis and urine is sent for *Chlamydia*/gonococcus. What is the most appropriate antibiotic to use?

- ☐ Erythromycin
- ☐ Ciprofloxacin
- ☐ Metronidazole
- ☐ Cefixime
- ☐ Azithromycin



Chlamydia - treat with azithromycin or doxycycline

Important for me Less important

Gonorrhoea would be demonstrated by the presence of Gram negative diplococci on the swab. As the swab showed non-specific urethritis a diagnosis of *Chlamydia* is most likely.

The 2009 SIGN guidelines suggest azithromycin should be used first-line due to potentially poor compliance with a 7 day course of doxycycline.

Dr Assem

Which of the following is true regarding the *Salmonella* species?

- ☐ Rose spots appear in all patients with typhoid
- ☐ They are normally present in the gut as commensals
- ☐ They are anaerobic organisms
- ☐ A relative bradycardia is often seen in typhoid fever
- ☐ *Salmonella typhi* can be categorised into type A, B and C

Rose spots appear in all patients with typhoid

7%

They are normally present in the gut as commensals

7%

They are anaerobic organisms

10%

A relative bradycardia is often seen in typhoid fever

57%

Salmonella typhi

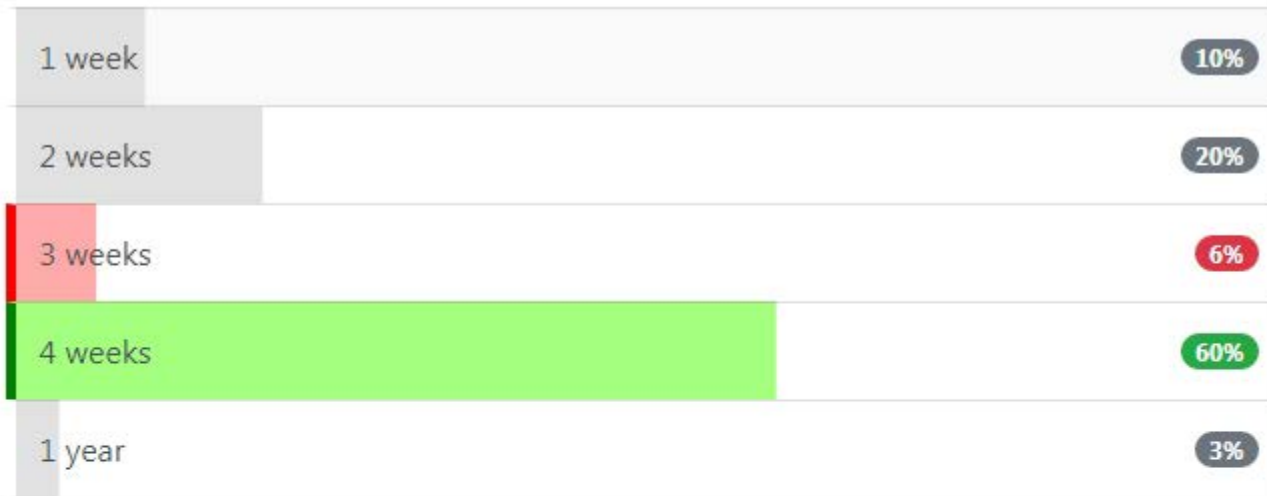
can be categorised into type A, B and C

18%

A 24-year-old male attends the clinic for a yellow fever vaccine before travelling to South America. He has no past medical history and takes no regular medicines. He states that he also had a varicella zoster vaccination a few weeks ago.

What is the minimum interval required between the last vaccination?

- ☐ 1 week
- ☐ 2 weeks
- ☐ 3 weeks
- ☐ 4 weeks
- ☐ 1 year



Live vaccines given by injection may be either given concomitantly or a minimum interval of 4 weeks apart to prevent risk of immunological interference

Important for me Less important

Live vaccines can be given on the same day. If not given on the same day, then there must be a 4 week interval between further live vaccinations to prevent the risk of immunological interference.

You are reviewing a 31-year-old man in the liver clinic. He is currently on triple therapy for hepatitis C. What is the best way to assess his response to treatment?

☐ Alanine transaminase level

☐ Anti-HCV antibodies

☐ Viral load

☐ Prothrombin time

☐ Hepatitis C genotype

Alanine transaminase level

6%

Anti-HCV antibodies

16%

Viral load

68%

Prothrombin time

4%

Hepatitis C genotype

6%

A 27-year-old man who has recently moved to the UK from Uganda presents complaining of fatigue and purple skin lesions all over his body. On examination he has multiple raised purple lesions on his trunk and arms. You also notice some smaller purple lesions in his mouth. He has recently started taking acyclovir for herpes zoster infection.

What is the most likely diagnosis?

- ☐ Dermatofibroma
- ☐ Kaposi's sarcoma
- ☐ Drug reaction to acyclovir
- ☐ Psoriasis
- ☐ Haemangioma

Dermatofibroma	4%
Kaposi's sarcoma	74%
Drug reaction to acyclovir	14%
Psoriasis	3%
Haemangioma	4%

Raised purple lesions is a classic description of Kaposi's sarcoma suggesting he has underlying HIV infection. HIV has a high prevalence in Uganda and the recent herpes zoster infection suggests he may have underlying immunocompromise.

Dermatofibromas are usually small pink/red nodules that are characteristically very firm and would not be found in the mouth. Psoriasis presents with red, scaly lesions and again is not seen on mucosal surfaces. A drug reaction is unlikely to present like this. A haemangioma can present with a purple raised lesion but again it would be unusual to see them in the mouth and Kaposi's sarcoma is much more likely in this case.

A 62-year-old man presents to the emergency department with a productive cough of green sputum and occasional bloody specks. On examination his temperature is 38.3°C, respiratory rate 23/min, heart rate 100/min and there is left basal coarse crackles with a small cold sore above his lips.

What is the most likely diagnosis?

- ☐ Streptococcal pneumonia
- ☐ Viral pneumonia
- ☐ Mycoplasma pneumonia
- ☐ Klebsiella pneumonia
- ☐ Legionella pneumonia

Streptococcal pneumonia	63%
Viral pneumonia	11%
Mycoplasma pneumonia	13%
Klebsiella pneumonia	8%
Legionella pneumonia	5%

This patient is most likely to be suffering from pneumonia secondary to streptococcal pneumoniae. It is the most common cause of community acquired pneumonia and further clues to this being the diagnosis is the evidence of a cold sore and the blood stained sputum.

For exam purposes, particular diagnosis of community acquired pneumonia have clues in the questions. Klebsiella is associated with cardiomyopathies and alcoholics, with upper lobar involvement, whereas Mycoplasma occurs in epidemics with skin changes and some haematological involvement. Legionella typically is a water borne infection with hyponatraemia and gastroenterological symptoms.

A 37-year-old woman who is being treated as an inpatient for *Mycoplasma pneumoniae* is reviewed. Unfortunately she is unable to tolerate clarithromycin due to severe nausea. What is the most suitable alternative antibiotic?

- ☐ Linezolid
- ☐ Cefaclor
- ☐ Ciprofloxacin
- ☐ Co-amoxiclav
- ☐ Doxycycline

Linezolid

10%

Cefaclor

4%

Ciprofloxacin

15%

Co-amoxiclav

8%

Doxycycline

63%

Mycoplasma pneumonia - treat with doxycycline or a macrolide

Important for me

Less important

A 31-year-old female presents to the genitourinary medicine clinic due to four fleshy, protuberant lesions on her vulva which are slightly pigmented. She has recently started a relationship with a new partner. What is the most appropriate initial management?

- ☐ Oral aciclovir
- ☐ Topical podophyllum
- ☐ Topical salicylic acid
- ☐ Topical aciclovir
- ☐ Electrocautery

Oral aciclovir

12%

Topical podophyllum

64%

Topical salicylic acid

6%

Topical aciclovir

8%

Electrocautery

10%

Genital wart treatment

- multiple, non-keratinised warts: topical podophyllum
- solitary, keratinised warts: cryotherapy

Important for me Less important

Cryotherapy is also acceptable as an initial treatment for genital warts

A 45-year-old female presents to the Emergency Department three days after returning from Thailand complaining of severe muscle ache, fever and headache. On examination she has a widespread maculopapular rash. Results show:

Malaria film: negative	
Hb	16.2 *10 ⁹ g/dl
Plt	96 *10 ⁹ /l
WBC	2.4 *10 ⁹ /l
ALT	146 iu/l

What is the most likely diagnosis?

- ☐ Hepatitis A
- ☐ Japanese encephalitis
- ☐ Rheumatic fever
- ☐ Malaria
- ☐ Dengue fever



The low platelet count and raised transaminase level is typical of dengue fever

A 25-year-old man who is taking immunosuppressive therapy for Adult onset Still's disease, and has come into contact with a child who has chicken pox. He is varicella zoster IgG antibody negative. He has a small number of early chicken pox blisters and you decide to start aciclovir therapy.

Which of the following fits best with the mode of action of aciclovir?

- ☐ DNA polymerase inhibitor
- ☐ DNA gyrase inhibitor
- ☐ Reverse transcriptase inhibitor
- ☐ NS3/4A inhibitor
- ☐ NS5A inhibitor

DNA polymerase inhibitor	62%
DNA gyrase inhibitor	11%
Reverse transcriptase inhibitor	17%
NS3/4A inhibitor	5%
NS5A inhibitor	5%

Aciclovir is much more specific for viral than mammalian DNA polymerase

Important for me Less important

Aciclovir is phosphorylated after entry into herpes infected cells to form aciclovir triphosphate. The first step in this process is dependant on the presence of HSV-coded thymidine kinase. Aciclovir triphosphate acts as an inhibitor of, and substrate for, the herpes-specific DNA polymerase, preventing further viral DNA synthesis without affecting normal cellular processes. It is 10-30 times more specific for viral DNA polymerase versus the human enzyme.

Bacterial DNA gyrase is the target of quinolone antibiotics. Reverse transcriptase is an enzyme target for the treatment of RNA viruses such as HIV. NS3/4A and NS5A are both targets in the treatment of hepatitis C. Modern antivirals which target NS3/4A and NS5A have revolutionised the treatment of hepatitis C, bringing cure into focus for the first time.

A 67 year patient with known emphysema presents to the Emergency Department with a two week history of cough productive of blood stained sputum. Chest X-Ray shows a circular area of dense right upper lobe consolidation. Despite seven days of intravenous antibiotics (piperacillin and tazobactam) his condition has not improved. An urgent inpatient bronchoscopy reveals no endobronchial lesion but broncho-alveolar lavage reveals an underlying pathogenic organism. Ziehl-Nielson staining is negative. What organism would you suspect?

- ☐ *Moraxella catarrhalis*
- ☐ *Aspergillus fumigatus*
- ☐ *Pseudomonas aeruginosa*
- ☐ *Mycobacterium tuberculosis*
- ☐ *Burkholderia cepacia*

<i>Moraxella catarrhalis</i>	9%
<i>Aspergillus fumigatus</i>	61%
<i>Pseudomonas aeruginosa</i>	10%
<i>Mycobacterium tuberculosis</i>	12%
<i>Burkholderia cepacia</i>	8%

This patient is likely to have developed an aspergilloma in an emphysematous cavity, which explains the lack of improvement with broad spectrum intravenous antibiotics, haemoptysis and chest X-Ray findings. *Moraxella* and *pseudomonas* are usually sensitive to piperacillin + tazobactam and do not classically cause clinical haemoptysis. *M. tuberculosis* is unlikely given the negative Ziehl-Nielson staining. *Burkholderia* is typically an infective organism in cystic fibrosis patients, not those with emphysema.

A 34-year-old man from Venezuela presents with a flu-like illness and periorbital oedema. Generalised lymphadenopathy is noted. A diagnosis of Chagas' disease is confirmed on blood smear. What is the most appropriate treatment?

- ☐ Benznidazole
- ☐ Sodium stibogluconate
- ☐ Metronidazole
- ☐ Pentamidine
- ☐ Atovaquone-proguanil

Benznidazole

54%

Sodium stibogluconate

7%

Metronidazole

9%

Pentamidine

23%

Atovaquone-proguanil

7%

A 29-year-old woman develops severe vomiting four hours after having lunch at a local restaurant. What is the most likely causative organism?

☐ *Escherichia coli*

☐ *Shigella*

☐ *Campylobacter*

☐ *Salmonella*

☐ *Staphylococcus aureus*



The short incubation period and severe vomiting point to a diagnosis of *Staphylococcus aureus* food poisoning.

A 19-year-old woman is reviewed in the genitourinary medicine clinic. She presented with vaginal discharge and dysuria. Microscopy of an endocervical swab showed a Gram-negative coccus that was later identified as *Neisseria gonorrhoea*. This is her third episode of gonorrhoea in the past two years. What is the most likely complication from repeated infection?

☐ Fitz-Hugh-Curtis syndrome

☐ Cervical cancer

☐ Arthropathy

☐ Infertility

☐ Uterine abscess

Fitz-Hugh-Curtis syndrome	19%
Cervical cancer	5%
Arthropathy	7%
Infertility	62%
Uterine abscess	7%

Infertility secondary to pelvic inflammatory disease (PID) is the most common complication of gonorrhoea. It is the second most common cause of PID after *Chlamydia*. Fitz-Hugh-Curtis syndrome (a complication of PID) and arthropathy may occur but are far less common.

Lymphogranuloma venereum is caused by *Chlamydia trachomatis*.

Which of the following anti-retroviral drugs is a known inducer of cytochrome P450?

☐ Nevirapine

☐ Ritonavir

☐ Saquinavir

☐ Nelfinavir

☐ Zidovudine



HIV: anti-retrovirals - P450 interaction

- nevirapine (a NNRTI): induces P450
- protease inhibitors: inhibits P450

Important for me Less important

Like other protease inhibitors, ritonavir is a potent inhibitor of the P450 system

A phlebotomist gives herself a needlestick injury whilst taking blood from a patient who is known to have the HIV infection. What is the chance that the phlebotomist will develop HIV?

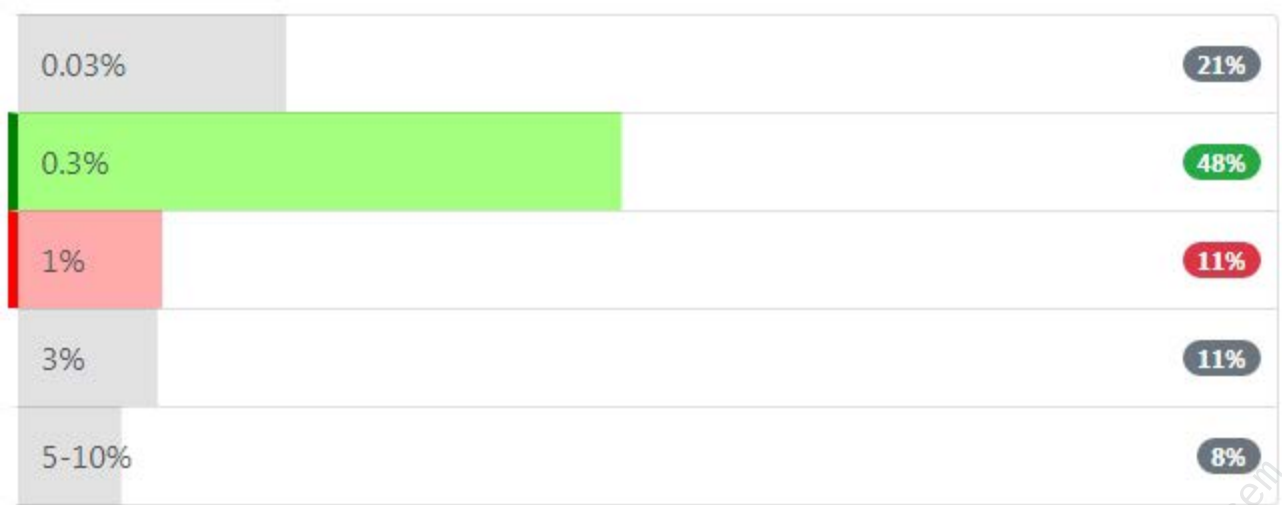
☐ 0.03%

☐ 0.3%

☐ 1%

☐ 3%

☐ 5-10%



The transmission rate of HIV is relatively low compared to hepatitis B and C.

A 48 year old farmer attends the emergency department 7 days after cutting his arm from falling on barbed wire in his field. He complains of fever, headache and painful spasms in his neck and back which last several minutes.

You suspect tetanus and he tells you he has completed a course of tetanus vaccination previously.

What is the most appropriate treatment?

- ☐ Tetanus booster
- ☐ IM tetanus immunoglobulin
- ☐ Tetanus antitoxin
- ☐ Flucloxacillin
- ☐ Ciprofloxacin

Tetanus booster

12%

IM tetanus immunoglobulin

61%

Tetanus antitoxin

20%

Flucloxacillin

3%

Ciprofloxacin

4%

In this case there is a high risk wound and symptoms so tetanus immunoglobulin would be advised alongside a muscle relaxant such as diazepam, and ventilatory support if needed. A tetanus booster is not recommended in the UK if the patient is already immunized. Tetanus antitoxin may be used in developing countries as it is cheaper but it has a higher rate of anaphylaxis and a shorter half life so is not recommended in the UK.

High risk wounds

- Wounds/burns needing surgery delayed more than 6 hours
- Wounds contaminated with soil
- Compound fractures
- Wounds containing foreign bodies
- Wounds/burns in people with systemic sepsis

A 27-year-old woman who is 10 weeks pregnant presents with 'cystitis'. She describes a two day history of dysuria, suprapubic pains and frequency. There has been no vaginal bleeding. Urine dipstick is positive for leucocytes and nitrites. Her temperature is 37.6°C. What is the most appropriate management?

- ☐ Oral nitrofurantoin
- ☐ Await the midstream specimen of urine (MSU) result
- ☐ Oral trimethoprim
- ☐ Oral ciprofloxacin
- ☐ Topical clotrimazole

Oral nitrofurantoin	60%
Await the midstream specimen of urine (MSU) result	8%
Oral trimethoprim	19%
Oral ciprofloxacin	10%
Topical clotrimazole	3%

This pregnant lady has symptoms consistent with a urinary tract infection. The BNF recommend that trimethoprim is avoided in the first trimester as it is a folate antagonist. Ciprofloxacin is contraindicated throughout pregnancy. As this patient clearly has a UTI and is pyrexial should be treated straightaway, rather than waiting for the MSU,

A 34-year-old sewage worker presents with a 3 days history of lower back pain, fever, myalgia, fatigue, jaundice and a subconjunctival haemorrhage. He has no past medical history and has not been abroad in the last 6 months.

Na ⁺	135 mmol/l
K ⁺	5.2 mmol/l
Urea	10 mmol/l
Creatinine	180 µmol/l

What is the most likely diagnosis?

- ☐ Leptospirosis
- ☐ Cysticercosis
- ☐ Glomerulonephritis
- ☐ Hepatitis A
- ☐ Hepatitis E

Leptospirosis	79%
Cysticercosis	5%
Glomerulonephritis	4%
Hepatitis A	7%
Hepatitis E	4%

Sewage workers are at risk of leptospirosis which is transmitted through rat urine. It typically presents as above and can progress to renal failure. Cysticercosis would not cause jaundice or renal failure. Glomerulonephritis should not cause jaundice or subconjunctival haemorrhage and acute viral hepatitis would not normally cause renal failure and would be unlikely without any travel history.

What is the first line antibiotic in the treatment of *Shigella* dysentery?

☐ Flucloxacillin

☐ Vancomycin

☐ Ciprofloxacin

☐ Metronidazole

☐ Ampicillin

Flucloxacillin

3%

Vancomycin

3%

Ciprofloxacin

58%

Metronidazole

30%

Ampicillin

5%

Which of the following anti-retroviral drugs is most characteristically associated with nephrolithiasis?

☐ Zidovudine

☐ Didanosine

☐ Indinavir

☐ Ritonavir

☐ Nevirapine

Zidovudine

19%

Didanosine

13%

Indinavir

38%

Ritonavir

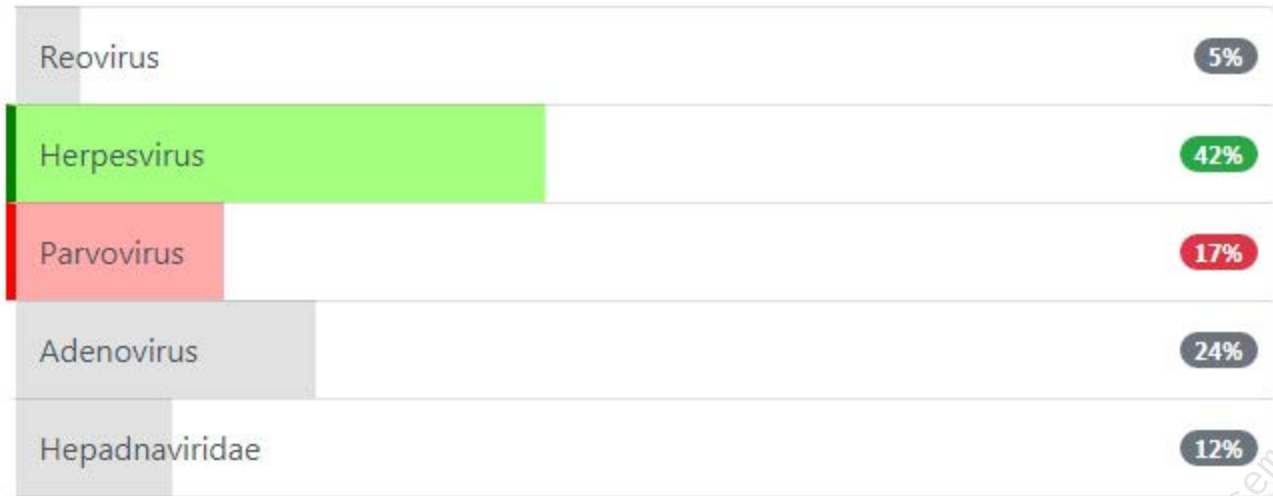
12%

Nevirapine

18%

A middle-aged man is diagnosed with nasopharyngeal carcinoma. What type of virus family is associated with this malignancy?

- ☐ Reovirus
- ☐ Herpesvirus
- ☐ Parvovirus
- ☐ Adenovirus
- ☐ Hepadnaviridae



The Epstein-Barr virus is one of the herpes viruses.

A 19-year-old female returns from Ghana. She presents with pyrexia (40°C). She complains of bloody stools preceding this. On examination, she has abdominal distension, hepatosplenomegaly and rose spots on her abdomen. Before empirical treatment has started she passes away due to bowel perforation, resulting in overwhelming sepsis. Which organism is responsible for this type of pathology?

- ☐ *Giardia lamblia*
- ☐ *Salmonella typhi*
- ☐ *Treponema pallidum*
- ☐ *Staphylococcus aureus*
- ☐ *Streptococcus pneumoniae*

Giardia lamblia

12%

Salmonella typhi

77%

Treponema pallidum

5%

Staphylococcus aureus

5%

Streptococcus pneumoniae

2%

Salmonella typhi infection can cause rose spots on the abdomen

Important for me Less important

Rose spots appear in *Salmonella typhi* infections. They also appear in *C.psittaci* infections although it is more associated with typhoid than psittacosis.

Giardiasis would not present this severely and acutely.

Syphilis would present with painless chancre.

Staphylococcus aureus would present within hours following ingestion and it is associated with violent vomiting.

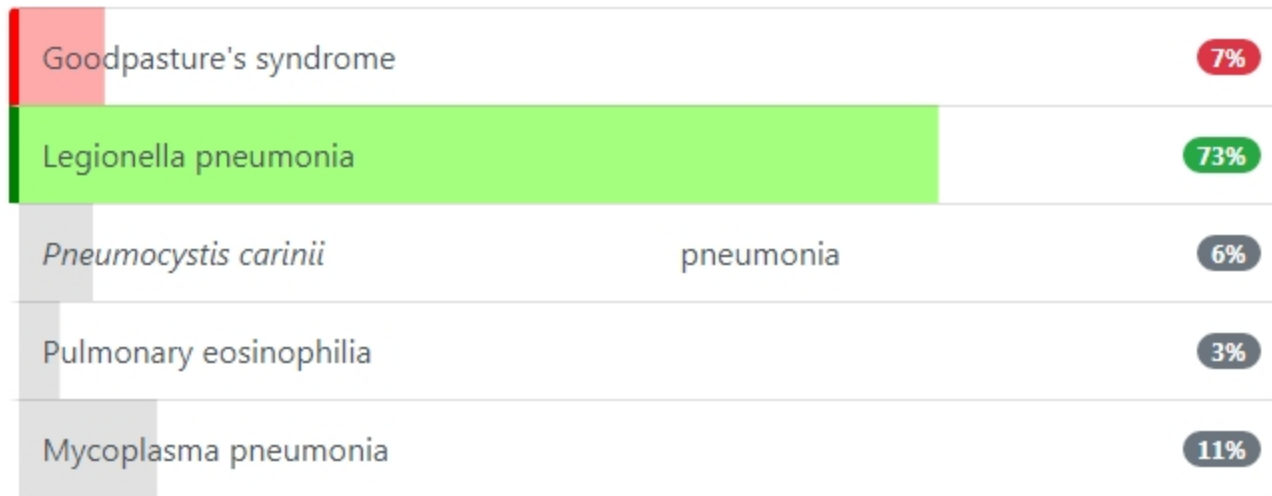
Streptococcus pneumoniae does not usually cause gastroenteritis.

A 55-year-old man is referred to the medical admissions unit. He recently returned from a holiday in Italy and has failed to respond to a course of co-amoxiclav for a suspected lower respiratory tract infection. Chest x-ray shows bilateral infiltrates. Bloods are as follows:

Na ⁺	122 mmol/l
K ⁺	4.3 mmol/l
Urea	8.4 mmol/l
Creatinine	130 μ mol/l

What is the likely diagnosis?

- ☐ Goodpasture's syndrome
- ☐ Legionella pneumonia
- ☐ *Pneumocystis carinii* pneumonia
- ☐ Pulmonary eosinophilia
- ☐ Mycoplasma pneumonia



Stereotypical features of *Legionella* include flu-like symptoms and a dry cough, relative bradycardia and confusion. Blood tests may show hyponatraemia

Important for me Less important

A 45-year-old male presents with yellow discolouration of his nails. On examination he has thickened yellow toe nails. You decide to treat him with terbinafine.

What is the mechanism of action of terbinafine?

- ☐ Interacts with microtubules to disrupt mitotic spindle
- ☐ Inhibits the fungal enzyme squalene epoxidase
- ☐ Binds with ergosterol
- ☐ Converted to 5-fluorouracil
- ☐ Inhibits synthesis of beta-glucan

Interacts with microtubules to disrupt mitotic spindle	28%
Inhibits the fungal enzyme squalene epoxidase	41%
Binds with ergosterol	14%
Converted to 5-fluorouracil	9%
Inhibits synthesis of beta-glucan	10%

Terbinafine inhibits the fungal enzyme squalene epoxidase, causing cellular death

Important for me Less important

Terbinafine inhibits the fungal enzyme squalene epoxidase, causing cellular death. It is an antifungal medication used to treat ringworm, pityriasis versicolor, and fungal nail infections.

Griseofulvin interacts with microtubules to disrupt mitotic spindle.

Amphotericin B binds with ergosterol forming a transmembrane channel.

Flucytosine is converted by cytosine deaminase to 5-fluorouracil, which inhibits thymidylate synthase and disrupts fungal protein synthesis.

Caspofungin inhibits synthesis of beta-glucan, a major fungal cell wall component

A 38-year-old HIV-positive woman who is 38 weeks into her first pregnancy comes to the obstetric clinic for review. She has been compliant with medication and her viral load has been consistently <50 copies. She would like to have a vaginal delivery and is keen to breastfeed after the birth.

What would you advise her regarding breastfeeding?

- ☐ She can breastfeed regardless of the viral load
- ☐ Breastfeeding is not recommended
- ☐ She can breastfeed as long as the baby is on the neonatal antiretroviral therapy
- ☐ She can breastfeed to a maximum of approximately 100ml a day
- ☐ She can breastfeed as long as the viral load remains at <50 copies

She can breastfeed regardless of the viral load

7%

Breastfeeding is not recommended

79%

She can breastfeed as long as the baby is on the neonatal antiretroviral therapy

6%

She can breastfeed to a maximum of approximately 100ml a day

2%

She can breastfeed as long as the viral load remains at <50 copies

6%

In the UK all HIV positive women should be advised not to breastfeed

Important for me Less important

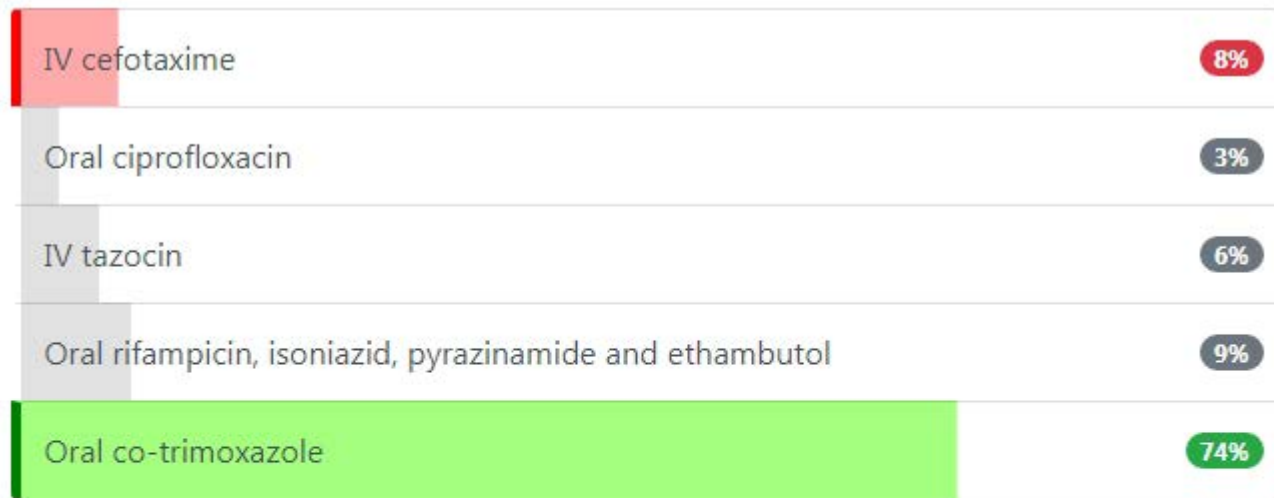
In the UK all HIV positive women should be advised not to breastfeed, hence only option 2 is correct. It is not advisable to breastfeed regardless of the viral load, the amount of breastfeeding or whether she or the baby is on the antiretroviral therapy.

A 34-year-old man from Swaziland presents to the emergency department with a 3 day history of fever, shortness of breath and a dry cough. His past medical history includes tuberculosis and HIV and his most recent CD4 count is 150.

On examination: heart rate 100/min, blood pressure 110/80mmHg, respiratory rate 28/min, oxygen saturation 98% on air at rest, dropping to 80% on walking. His temperature is 38.5°C. On auscultation, his chest is clear.

How would you treat this man?

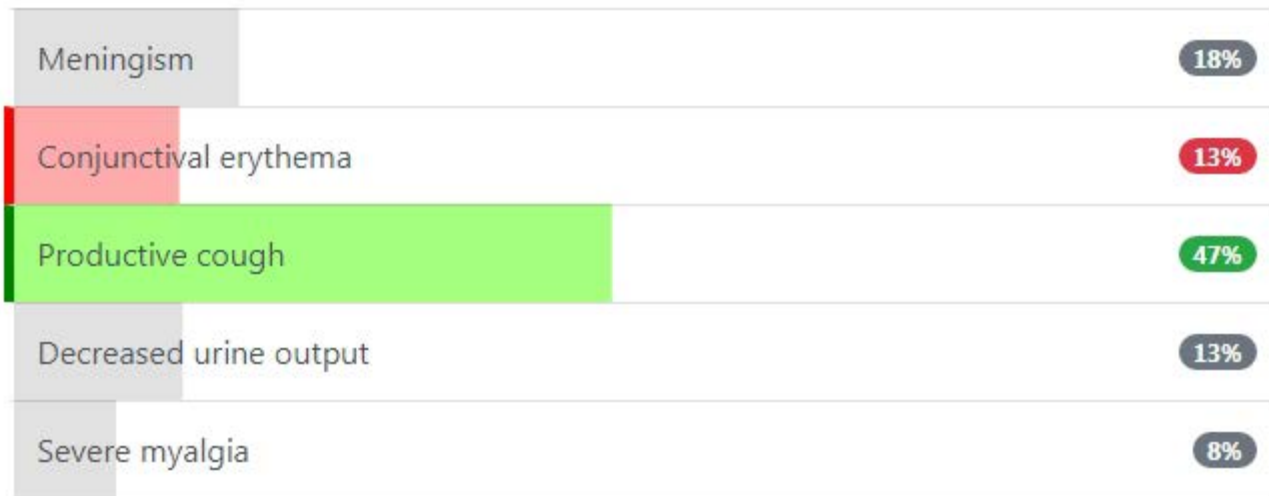
- ☐ IV cefotaxime
- ☐ Oral ciprofloxacin
- ☐ IV tazocin
- ☐ Oral rifampicin, isoniazid, pyrazinamide and ethambutol
- ☐ Oral co-trimoxazole



This man has pneumocystis jirovecii pneumonia (PCP) which occurs in HIV positive patients with a low CD4 count. It classically presents with a fever, dyspnoea, dry cough, exercise induced desaturation and very few chest signs. It is treated with oral co-trimoxazole or IV pentamidine in severe cases.

A 50-year-old sewage worker presents with a one week history of fever and feeling generally unwell. Which one of the following features would be least consistent with a diagnosis of leptospirosis?

- ☐ Meningism
- ☐ Conjunctival erythema
- ☐ Productive cough
- ☐ Decreased urine output
- ☐ Severe myalgia



Pulmonary complications can occur in leptospirosis but generally happen in severe and late-stage disease. Severe disease may result in acute respiratory distress syndrome or pulmonary haemorrhage.

A 33-year-old primigravida woman presents to her GP at 22 weeks gestation with a 2-day history of painful shallow ulcers on the labia and vagina; she has had one prior outbreak of herpes 2 years previously with a viral swab performed at that time positive for HSV2. She is otherwise well and her 20-week scan was normal. She is concerned about how HSV may affect her pregnancy and whether it will be safe for her to deliver vaginally.

What should you advise her?

- ☐ There is high risk of blood borne neonatal transmission of HSV regardless of treatment
- ☐ All antiviral medications normally used in herpes are teratogenic and should be avoided
- ☐ Ibuprofen and salt water bathing are recommended for analgesia
- ☐ Most women with outbreaks of recurrent HSV during pregnancy are recommended to deliver by elective caesarean section
- ☐ Suppressive treatment with aciclovir from 36 weeks gestation may be considered

There is high risk of blood borne neonatal transmission of HSV regardless of treatment

6%

All antiviral medications normally used in herpes are teratogenic and should be avoided

5%

Ibuprofen and salt water bathing are recommended for analgesia

4%

Most women with outbreaks of recurrent HSV during pregnancy are recommended to deliver by elective caesarean section

43%

Suppressive treatment with aciclovir from 36 weeks gestation may be considered

42%

Recurrent herpes outbreaks in pregnancy should be treated with suppressive therapy; risk of transmission to the baby is low and aciclovir is safe to use in pregnant women

Important for me Less important

Aciclovir, while not licensed for use in pregnancy, is commonly used in pregnancy and is thought to be safe; valaciclovir and famciclovir should be avoided. Suppressive treatment is often considered from 36 weeks to reduce asymptomatic shedding and risk of transmission during delivery. Vaginal delivery is usually anticipated in recurrent genital herpes. Ibuprofen is contraindicated in pregnancy

Dr Assem

A 31-year-old woman who is known to be HIV positive presents following a positive pregnancy test. Her last menstrual period was 6 weeks ago. The last CD4 count was $420 \times 10^6/l$ and she does not take any antiretroviral therapy. What is the most appropriate management with regards to antiretroviral therapy?

- ☐ Check CD4 at 12 weeks and initiate antiretroviral therapy if CD4 count is less than $350 \times 10^6/l$
- ☐ Do not give antiretroviral therapy
- ☐ Start antiretroviral therapy at 20-32 weeks
- ☐ Start antiretroviral therapy at 10-12 weeks
- ☐ Start antiretroviral therapy immediately

Check CD4 at 12 weeks and initiate antiretroviral therapy if CD4 count is less than 350×10^6

6/11 7%

Do not give antiretroviral therapy

3%

Start antiretroviral therapy at 20-32 weeks

8%

Start antiretroviral therapy at 10-12 weeks

4%

Start antiretroviral therapy immediately

78%

Following the 2015 BHIVA guidelines, it is now recommended that patients start HAART as soon as they have been diagnosed with HIV, regardless of whether they are pregnant or not, rather than waiting until a particular CD4 count, as was previously advocated.

A 44-year-old farmer presents with headache, fever and muscle aches. He initially thought he had a bad cold but his symptoms have got progressively worse over the past week. During the review of systems he reports nausea and a decreased urine output. On examination his temperature is 38.2°C, pulse 102 / min and his chest is clear. Subconjunctival haemorrhages are noted but there is no evidence of jaundice. What is the most likely diagnosis?

☐ Mycoplasma pneumonia

☐ Lyme disease

☐ Legionella pneumonia

☐ Listeria

☐ Leptospirosis



The main clue in the question is the patient's occupation. Mycoplasma and Legionella are less likely due to the absence of chest symptoms and signs. Liver failure is seen in only 10% of patients with leptospirosis..

You are an F2 working in general practice. Last week you saw a 17-year-old female with acne vulgaris which is causing her significant distress and started her on tetracycline. She has come back to see you today complaining about a side effect. Which side effect is she most likely to be experiencing?

- ☐ Headache
- ☐ Red rash on her face and neck
- ☐ Dizziness
- ☐ Dry lips and tongue
- ☐ Ringing in her ears

Headache	11%
Red rash on her face and neck	45%
Dizziness	7%
Dry lips and tongue	16%
Ringing in her ears	21%

Tetracyclines can cause photosensitivity

Important for me Less important

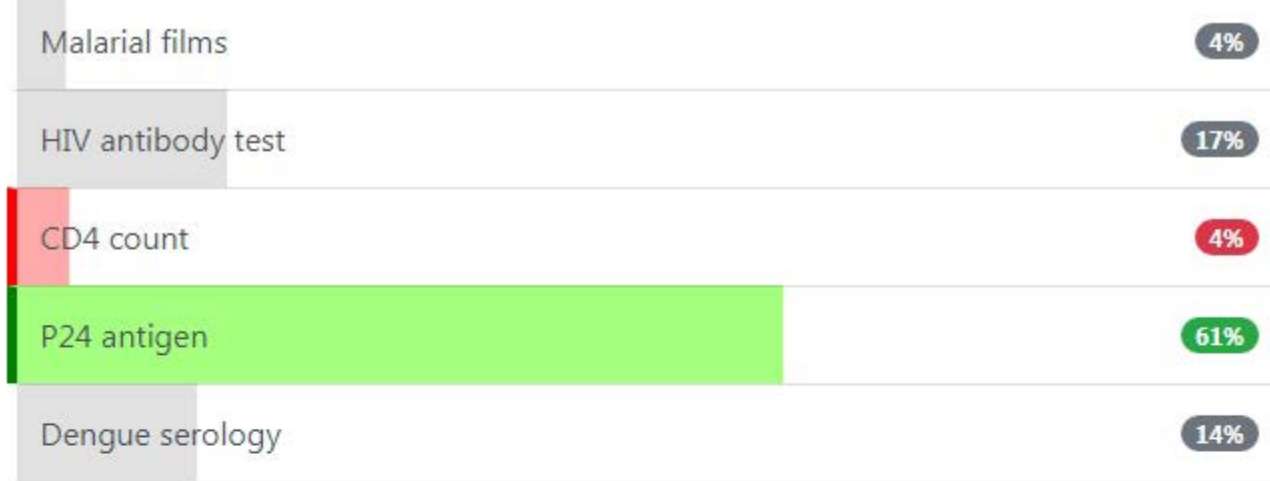
The correct answer is 2. Tetracyclines are often prescribed for acne and can cause a photosensitive skin rash. This appears as a red rash on areas of skin exposed to the sun. Other skin reactions to tetracyclines include exfoliative dermatitis and Stevens-Johnson syndrome.

Nausea and headaches a common side effect of many medications but are not usually a significant problem with tetracyclines. Tetracyclines can cause grey discolouration of the teeth in neonates if they are given to pregnant women in the second or third trimester but not if given to children or adults. Dry lips and tongue are a side effect of vitamin A derivatives, including retinoin and isotretinoin, which might be prescribed further down the line in severe acne. Tetracyclines are not known to cause damage to the hearing, unlike gentamicin, furosemide and cisplatin.

A 57-year-old businessman presents to the emergency department with fevers, myalgia and headache which have been ongoing for the past 10 days. He also reports that he has noticed the beginnings of a rash on his face and trunk, which you would describe as maculopapular. He has no significant past medical history, and recently returned from a trip to Bangkok three weeks ago, where he admits to having intercourse with a local sex worker. He cannot remember if he used protection. Otherwise he made sure to take appropriate precautions with malarial prophylaxis and pre-travel vaccines.

Which of the following tests would be most likely to give a diagnosis in this history?

- ☐ Malarial films
- ☐ HIV antibody test
- ☐ CD4 count
- ☐ P24 antigen
- ☐ Dengue serology



HIV antibody testing is most reliable 3 months post exposure

Important for me Less important

This patient's symptoms are most likely secondary to an acute HIV seroconversion syndrome. This occurs most commonly 1-4 weeks from time of infection with the virus and in the majority of patients, is accompanied by a flu-like illness with a maculopapular rash. This illness marks the beginning of HIV antibody production, but this test is still often negative during the process. p24 antigen however is most often positive for the first 3-4 weeks following exposure, while the antibodies can take up to 3 months to be detected.

Malaria is unlikely given this patient's use of prophylaxis and that Bangkok has a relatively low risk of malaria transmission. Dengue fever, although capable producing similar symptoms, often causes fever for a shorter duration.

A 32-year-old oil worker presents by ambulance to the Emergency Department following his return from Angola. His wife reports that over the past 24 hours, the patient has become progressively more drowsy with fevers ongoing for the past 5 days. On examination, the patient is unresponsive to voice and is visibly clammy. His observations are as follows:

Heart rate	120 beats per minute
Blood pressure	100/60 mmHg
Respiratory rate	32 breaths per minute
SpO ₂	96% on 15L O ₂

Initial investigations are as follows:

Hb	78 g/l
Platelets	90 * 10 ⁹ /l
WBC	20 * 10 ⁹ /l
Na ⁺	140 mmol/l
K ⁺	5.6 mmol/l
Urea	15 mmol/l
Creatinine	190 µmol/l
Bilirubin	70 µmol/l
Malarial Films	<i>P. falciparum</i> species seen, 12% parasitaemia

Given this patient's condition, what treatment(s) should be commenced?

☐ Chloroquine
☐ Artesunate and exchange transfusion
☐ Artesunate
☐ Doxycycline
☐ Quinine + Doxycycline

Chloroquine

6%

Artesunate and exchange transfusion

69%

Artesunate

15%

Doxycycline

5%

Quinine + Doxycycline

6%

Exchange transfusion should be considered in cases of severe parasitaemia ($>10\%$)

Important for me Less important

This patient has presented with features suggestive of severe malaria, which is confirmed by his blood results and clinical observations.

Falciparum malaria warrants aggressive treatment given its potential complications. These occur due to the parasites ability to sequester blood cells in capillary beds, causing ischaemia.

Patients with severe malaria should be treated with IV artesunate, and in cases where parasitaemia $>10\%$ is seen, consideration should be given to the performance of exchange transfusions.

Most falciparum malaria is now resistant to chloroquine medications, so this option is incorrect. Quinine and doxycycline may be used for some cases of falciparum malaria, however, this practice is no longer first-line.

Dr Assem

A 34-year-old man with a past history of HIV infection presents to the Emergency Department with watery diarrhoea. Cryptosporidium infection is confirmed on ZN staining. What is the most suitable management?

- ☐ Metronidazole
- ☐ Sulfadiazine + pyrimethamine
- ☐ Supportive therapy
- ☐ Rifampicin + ethambutol + clarithromycin
- ☐ Co-trimoxazole

Metronidazole

14%

Sulfadiazine + pyrimethamine

19%

Supportive therapy

33%

Rifampicin + ethambutol + clarithromycin

15%

Co-trimoxazole

18%

Supportive therapy is the mainstay of treatment in *Cryptosporidium* diarrhoea

Important for me Less important

A 29-year-old woman presents to the genitourinary medicine clinic for treatment of recurrent genital warts. Which one the following viruses are most likely to be responsible?

☐ Human papilloma virus 16 & 18

☐ Human papilloma virus 13 & 17

☐ Human papilloma virus 6 & 11

☐ Human papilloma virus 12 & 14

☐ Human papilloma virus 15 & 21

Human papilloma virus 16 & 18

32%

Human papilloma virus 13 & 17

5%

Human papilloma virus 6 & 11

54%

Human papilloma virus 12 & 14

4%

Human papilloma virus 15 & 21

5%

Genital warts - 90% are caused by HPV 6 & 11

Important for me Less important

Types 6 and 11 are responsible for 90% of genital warts cases

Dr Assem

A 21-year-old female comes to see her GP complaining of a three day history of dysuria, frequency and a mild fever. She has no abdominal or loin pain and a urine dipstick done at the practice shows 2+ leucocytes but negative for blood, protein and nitrites.

Which of the following organisms is the most likely cause of the infection?

- ☐ *Escherichia Coli*
- ☐ *Staphylococcus saprophyticus*
- ☐ *Proteus mirabilis*
- ☐ *Pseudomonas aeruginosa*
- ☐ *Klebsiella pneumoniae*

<i>Escherichia Coli</i>	48%
<i>Staphylococcus saprophyticus</i>	34%
<i>Proteus mirabilis</i>	12%
<i>Pseudomonas aeruginosa</i>	4%
<i>Klebsiella pneumoniae</i>	3%

This patient has symptoms of a lower urinary tract infection which should be treated with antibiotics. The clue to finding the correct answer is the fact that despite being leucocyte positive, the urine dipstick is nitrite negative. Gram negative organisms test positive on the nitrite test as they convert nitrates to nitrites for energy. Gram positive organisms are unable to reduce nitrate to nitrite and therefore, test negative. As staphylococcus species are the only gram positive organisms of the answers given, this is the correct answer.

A 56-year-old diabetic man was admitted with pyrexia and rigors secondary to an infected diabetic foot ulcer and commenced on IV Flucloxacillin. The wound swab grew methicillin resistant *Staphylococcus Aureus* (MRSA) and he was commenced on an alternative IV antibiotic. Within an hour of administration the patient developed an itchy, erythematous maculopapular rash, which became diffuse covering >80% of his body surface area. He also began to complain of hearing loss in his right ear.

What antibiotic is likely to have been prescribed?

- ☐ Teicoplanin
- ☐ Co-Amoxiclav
- ☐ Clindamycin
- ☐ Vancomycin
- ☐ Cefuroxime

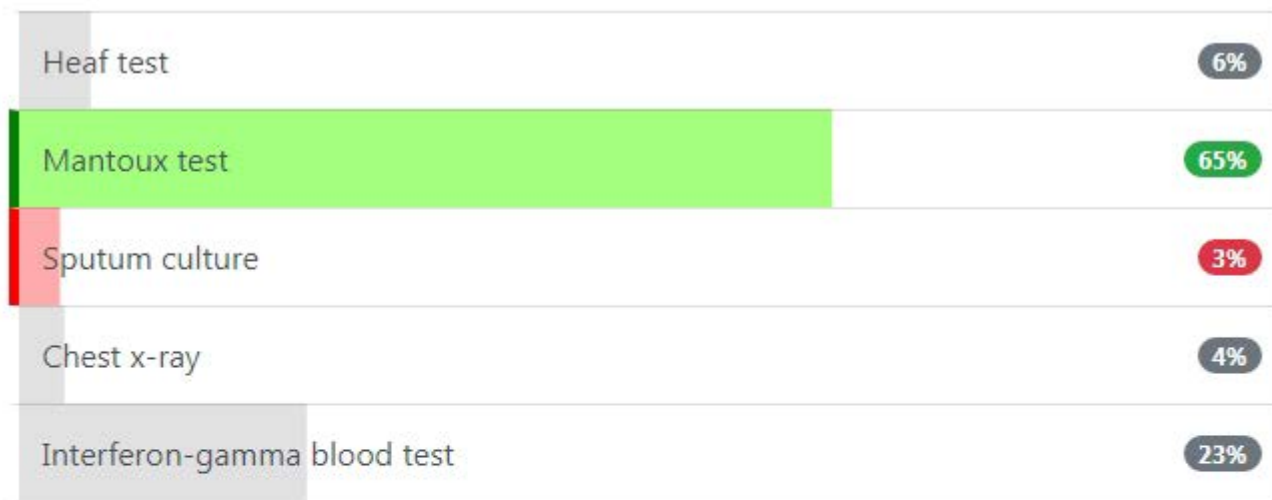


Vancomycin is a glycopeptide antibiotic, which works by blocking cell wall subunit assembly (separate from beta lactams). The antibiotic has extensive gram positive cover and is commonly used to treat MRSA and Clostridium difficile.

The characteristic side effects include: Ototoxicity, nephrotoxicity and red man syndrome. Red man syndrome is associated with flushing or a maculopapular rash. The proposed mechanism is non IgE mediated mast cell degranulation. Red man syndrome is more common with higher flow rates of infusion. Treatment includes antihistamines.

A 30-year-old man comes for review. He lives with a woman who has recently been diagnosed with having tuberculosis. The man was born in the UK, has no past medical history of note and is currently asymptomatic. What is the most appropriate test to check for latent tuberculosis?

- ☐ Heaf test
- ☐ Mantoux test
- ☐ Sputum culture
- ☐ Chest x-ray
- ☐ Interferon-gamma blood test



The two main tests used for screening in the UK are the Mantoux (skin) test and the interferon-gamma (blood) test. Whilst the use of the interferon-gamma test is increasing it is still reserved for specific situations, none of which apply in this case. Please see the NICE guidelines for more details.

The Heaf test is no longer used in the UK.

A 58-year-old man presents with fever, chills and back pain for the past four weeks. A chest x-ray and urine culture are unremarkable. Around two months ago he went to stay with family on a Cypriot sheep farm. A chest x-ray and urine culture are unremarkable. A diagnosis of Brucellosis is suspected. Which one of the following tests is most likely to confirm the diagnosis?

- ☐ Stool culture
- ☐ Blood cultures
- ☐ Brucella serology
- ☐ Liver biopsy
- ☐ Urinary antigen



A 24-year-old man attends your GUM clinic for results of his recent tests. He frequently engages in unprotected sex with multiple partners. You note he had a mildly raised Venereal Disease Research Laboratory (VDRL) test at 1:8. He did however have a negative EIA and TPPA test. You suspect it could be a false positive test result.

Which of the following would be useful at determining a cause?

- ☐ HIV test
- ☐ Rheumatoid factor
- ☐ Serum electrophoresis
- ☐ Varicella serology
- ☐ *Mycoplasma* serology

HIV test	55%
Rheumatoid factor	13%
Serum electrophoresis	15%
Varicella serology	9%
<i>Mycoplasma</i> serology	9%

False positive VDRL/RPR: *'Sometimes Mistakes Happen'* (SLE, TB, malaria, HIV)

Important for me Less important

The answer is HIV test. The VDRL test is very sensitive for syphilis infections and titres can be used to track treatment and progression. It is, however, prone to many false positives. This is defined by a positive VDRL in the absence of a positive EIA/TPPA (which, in contrast, stay positive lifelong after infection).

False positives are usually due to a reaction of antibodies to the cardiolipin-lecithin-cholesterol reagent in the RPR/VDRL tests.

Systemic lupus erythematosus, HIV, antiphospholipid syndrome and TB infection are classic causes of this. Other Treponemal infections like yaws and pinta can also cause false positives, but this would not occur with atypical bacteria such as *Mycoplasma*.

A 57-year-old female presents with headache and fever to the Emergency Department. On examination neck stiffness is noted along with a positive Kernig's sign. A lumbar puncture is performed and reported as follows:

CSF culture

Gram positive bacilli

What is the most likely causative organism?

- ☐ *Cryptococcus*
- ☐ *Haemophilus influenzae*
- ☐ *Streptococcus pneumoniae*
- ☐ *E. coli*
- ☐ *Listeria monocytogenes*

Cryptococcus

4%

Haemophilus influenzae

12%

Streptococcus pneumoniae

20%

E. coli

4%

Listeria monocytogenes

60%

Listeria monocytogenes - Gram-positive rod

Important for me Less important

Which one of the following is a Gram negative coccus?

☐ *Haemophilus influenzae*

☐ *Moraxella catarrhalis*

☐ *Enterococcus faecalis*

☐ *Listeria monocytogenes*

☐ *Campylobacter jejuni*

Haemophilus influenzae

11%

Moraxella catarrhalis

63%

Enterococcus faecalis

13%

Listeria monocytogenes

8%

Campylobacter jejuni

5%

Moraxella catarrhalis - Gram-negative cocci

Important for me Less important

Following a diagnosis of tetanus, what is the most appropriate antibiotic therapy to give with human tetanus immunoglobulin?

- ☐ IV clarithromycin
- ☐ IV benzylpenicillin
- ☐ IV gentamicin
- ☐ IV metronidazole
- ☐ IV ciprofloxacin

IV clarithromycin

8%

IV benzylpenicillin

39%

IV gentamicin

4%

IV metronidazole

38%

IV ciprofloxacin

10%

A 87 year old lady presents to the Emergency Department with a two day history of new confusion. Her heart rate is 120 beats per minute, blood pressure 95/45 mmHg and temperature 38.4°C. You suspect urinary sepsis and after taking urine and blood cultures you start appropriate treatment with intravenous fluids and broad spectrum antibiotics. Later that day the microbiology lab phones to inform you the microscopy of the urine sample shows Gram positive cocci in clusters. What is the likely organism in this case?

- ☐ *Escherichia coli*
- ☐ *Klebsiella pneumoniae*
- ☐ *Staphylococcus saprophyticus*
- ☐ *Enterococcus faecalis*
- ☐ *Staphylococcus aureus*

<i>Escherichia coli</i>	8%
<i>Klebsiella pneumoniae</i>	6%
<i>Staphylococcus saprophyticus</i>	39%
<i>Enterococcus faecalis</i>	18%
<i>Staphylococcus aureus</i>	30%

Prompt treatment of sepsis is essential to improve patient outcomes. Broad spectrum antibiotics should be given promptly after microbiological specimens are taken. Antibiotic therapy should be altered when the causative organism is known. In this case a Gram positive cocci in clusters grown from the urine is most likely to be *S. saprophyticus*. *S. aureus* is a common pathogen but is unusual in urinary infections. Although *E. coli* and *K. pneumoniae* are common urinary pathogens they are both Gram negative bacilli. Enterococcus commonly forms chains on microscopy.

A 28-year-old student is admitted out of hours to the infectious diseases ward with suspected malaria following a backpacking trip around South East Asia. Malarial films are as follows:

Thick film	Parasite burden of 1.5%
Thin film	Non-falciparum malaria - Looks like <i>Plasmodium knowlesi</i>

On admission, the patient is systemically well with observations at follows:

HR	90bpm
BP	123/75 mmHg
RR	16 breaths per minute
Oxygen Sats	97% on air
Temp	36.4°

Although being relatively well on first admission, you are called to review her overnight a few hours later, due to her condition worsening. You arrive to find her observations as follows:

HR	110bpm
BP	105/65 mmHg
RR	25 breaths per minute
Oxygen Sats	93% on air
Temp	38.4°

Which of the following attributes make *Plasmodium knowlesi* infections particularly dangerous?

☐ Cytoadherence
☐ Hypnozoite formation
☐ Short erythrocytic replication stage
☐ Resistance to treatment
☐ Slow growth leading to late presentation

Cytoadherence	9%
Hypnozoite formation	20%
Short erythrocytic replication stage	42%
Resistance to treatment	16%
Slow growth leading to late presentation	13%

P. knowlesi has the shortest erythrocytic replication cycle, leading to high parasite counts in short periods of time

Important for me Less important

Plasmodium sp. have two reproductive cycles; an exo-erythrocytic cycle which occurs in hepatocytes, and an erythrocytic cycle which occurs in the red blood cells. The length of the erythrocytic cycle varies from species to species, with *P. knowlesi* having the fastest cycle at around 24 hours. The end stage in the cycle involves lysis of the red cells and release of additional parasites, meaning that *P. knowlesi* is capable of producing very high parasite counts in a short space of time.

For this reason, in *Plasmodium knowlesi* infection, severe parasitaemia should be defined as $>1\%$, whereas in other species, $>2\%$ is a marker of severe parasitaemia.

In regards to other options, *Plasmodium ovale* and *Plasmodium vivax* can form hypnozoites, causing clinical infection long after patients leave malarial areas. Cytoadherence is an attribute displayed by red cells infected by *Plasmodium falciparum* parasites.

Which one of the following features is least likely to occur in a patient with visceral leishmaniasis?

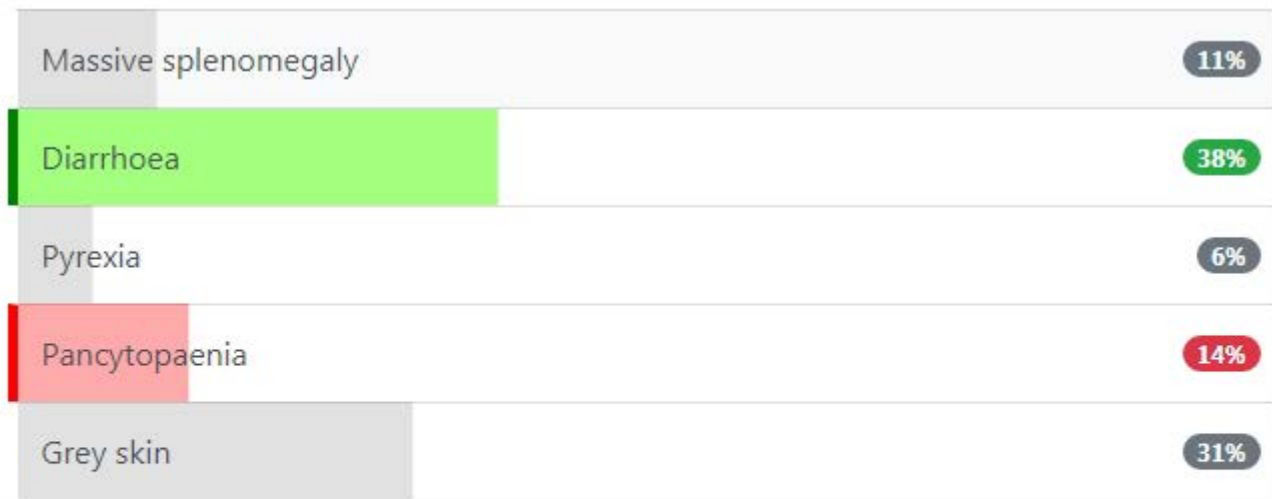
☐ Massive splenomegaly

☐ Diarrhoea

☐ Pyrexia

☐ Pancytopenia

☐ Grey skin



The most common symptoms seen in patients with visceral leishmaniasis are pyrexia, splenomegaly (which is often massive), weight loss and night sweats. Pancytopaenia occurs secondary to hypersplenism. Diarrhoea is not a typical feature

A 36-year-old man presents to his family physician complaining of swallowing difficulty. He reports that a few times he has been vomiting undigested food. He does not smoke or take alcohol. He has never had such symptoms in the past. He has no significant past medical or family history.

He works as a wildlife photographer and has repeatedly traveled to Argentina, Brazil, and Bolivia in the past. As far as he can remember he never had any serious infection while traveling except for the one time he had a swollen right eye which resolved now. A barium swallow revealed a bird's beak appearance of the esophagus.

Which of the following conditions does this patient most likely suffer from?

- ☐ African trypanosomiasis
- ☐ Visceral leishmaniasis
- ☐ Giardiasis
- ☐ Cryptosporidiosis
- ☐ American trypanosomiasis

African trypanosomiasis	11%
Visceral leishmaniasis	20%
Giardiasis	4%
Cryptosporidiosis	9%
American trypanosomiasis	56%

Trypanosomiasis: African-form causes sleeping sickness and American-form causes Chagas' disease

Important for me Less important

This patient presented with the signs and symptoms consistent with a diagnosis of Chagas disease. The disease is caused by a protozoal infection by the organism *Trypanosoma cruzi* and is also known as American trypanosomiasis. The triatomine bug, a type of reduviid bug, transmit the disease via a painless fly and is common in South America.

The acute stage of the disease is characterized by the periorbital sign, also known as the Romana sign. Later on, patients develop dilated cardiomyopathy and gastrointestinal problems such as megacolon and megaesophagus. Neurological involvement includes neuritis which produces altered sensation and reflexes. Treatment is with a combination of Sulfadiazine and pyrimethamine.
(First 2017, p152-154).

1: African trypanosomiasis is caused by the protozoal organism *Trypanosoma brucei*. The disease is also known as sleeping sickness and is transmitted by the Tsetse fly via a painful bite. Symptoms include lymphadenopathy, somnolence, extreme lethargy, fever, and headaches. Treatment is with suramin and melarsoprol if the central nervous system is involved.

2: Visceral leishmaniasis is caused by the protozoal organism *Leishmania donovani*. The disease is transmitted by the sandfly. Clinical manifestation of the disease includes fever, weight loss, hepatosplenomegaly and hematological disturbances such as pancytopenia.

3: Giardiasis is caused by the protozoal organism *Giardia lamblia*. It typically includes gastrointestinal symptoms such as loose stools, fatty diarrhea, flatulence and bloating. The disease is transmitted by cysts in water. It is common among travelers and hikers who are often exposed to less hygienic sources of water. It is treated with the antibiotic metronidazole.

4: Cryptosporidiosis is caused by the protozoal organism *Cryptosporidium*. The disease is transmitted by the oocysts in water. In people with AIDS, the disease is severe and consist of severe diarrhea. However, in people who are not immunosuppressed, the presentation includes a mild watery stool, bloating and flatulence. A public health approach to preventing the disease is to filter water supplies. Nitazoxanide can be used for treatment in individuals who are not immunosuppressed.

A 28-year-old male presents with shortness of breath, dry cough and fever for one week. Prior to this, he had been generally unwell for several months complaining of weight loss, fatigue, generalised lymphadenopathy and myalgia. He admits to using intravenous drugs in the past.

Observations reveal O₂ sats 88% on air, heart rate 112 bpm, blood pressure 124/85mmHg, respiratory rate 24/min and temperature 37.8°C. His chest is clear and heart sounds are normal. On mobilising his O₂ sats drop to 75% on air and he is acutely short of breath.

Chest x-ray shows bilateral perihilar shadowing.

Arterial blood gas on 5 litres of oxygen shows:

pH	7.41
PaO ₂	8.9 kPa
PaCO ₂	3.6 kPa

What is the most appropriate treatment for this patient?

- ☐ Amoxicillin and clarithromycin
- ☐ Co-trimoxazole
- ☐ Co-trimoxazole and prednisolone
- ☐ Doxycycline
- ☐ Oseltamivir



This patient has *Pneumocystis jirovecii* pneumonia most likely on a background of undiagnosed HIV infection. Treatment for pneumocystis pneumonia is with oral co-trimoxazole or IV pentamidine if oral antibiotics are not tolerated. Steroids are also given if there is severe hypoxaemia, as in this case.

A 24-year-old man is admitted to the Emergency Department with breathing difficulties and confusion three weeks after returning from a holiday in Cambodia. His partner says he has had 'the flu' for the past two weeks. A blood film is positive for malarial parasites and a chest x-ray and arterial blood gases suggest acute respiratory distress syndrome. A diagnosis of severe falciparum malaria is suspected. What is the treatment of choice?

- ☐ Intravenous artesunate
- ☐ Intravenous clindamycin + oral artemether-lumefantrine
- ☐ Intravenous artemether-lumefantrine
- ☐ Oral atovaquone-proguanil
- ☐ Intravenous quinine

Intravenous artesunate

61%

Intravenous clindamycin + oral artemether-lumefantrine

5%

Intravenous artemether-lumefantrine

23%

Oral atovaquone-proguanil

3%

Intravenous quinine

8%

Severe falciparum malaria - intravenous artesunate

Important for me Less important

A 30-year-old man presents for review two weeks after returning from a camping holiday in the New Forest. For the past few days he has felt general unwell with lethargy and arthralgia. On examination he has a rash consistent with erythema chronicum migrans. What is the most appropriate test to perform given the likely diagnosis?

- ☐ ELISA test for antibodies to *Borrelia burgdorferi*
- ☐ Polymerase chain reaction for *Borrelia* DNA
- ☐ Blood cultures
- ☐ Blood film
- ☐ Bone marrow biopsy

ELISA test for antibodies to	<i>Borrelia burgdorferi</i>	60%	
Polymerase chain reaction for	<i>Borrelia</i>	DNA	23%
Blood cultures			7%
Blood film			6%
Bone marrow biopsy			4%

ELISA is the first-line investigation for suspected Lyme disease in patients with no history of erythema migrans

Important for me [Less important](#)

Serological tests are the most appropriate first line investigation for diagnosing Lyme disease. ELISA tests are preferred to Western blots as they are more sensitive.

A 22-year-old woman who is an immigrant from Malawi presents for review as she thinks she is pregnant. This is confirmed with a positive pregnancy test. She is known to be HIV positive. Which one of the following should NOT be part of the management plan to ensure an optimal outcome?

- ☐ Oral zidovudine for the newborn until 6 weeks of age
- ☐ Maternal antiretroviral therapy
- ☐ Encourage breast feeding
- ☐ Intrapartum zidovudine infusion
- ☐ Elective caesarean section

Oral zidovudine for the newborn until 6 weeks of age	6%
Maternal antiretroviral therapy	4%
Encourage breast feeding	75%
Intrapartum zidovudine infusion	7%
Elective caesarean section	8%

The BHIVA guidelines suggest vaginal delivery may be an option for women on HAART who have an undetectable viral load but whether this will translate into clinical practice remains to be seen

In terms of breastfeeding the BHIVA guidelines state the following:

All mothers known to be HIV positive, regardless of antiretroviral therapy, and infant PEP, should be advised to exclusively formula feed from birth.

A 27-year-old woman develops fever and lymph node swelling after being scratched by her cat. Which one of the organisms is responsible for cat scratch disease?

- ☐ *Bordetella pertussis*
- ☐ *Moraxella catarrhalis*
- ☐ *Bartonella henselae*
- ☐ *Francisella tularensis*
- ☐ *Yersinia enterocolitica*

Bordetella pertussis

8%

Moraxella catarrhalis

9%

Bartonella henselae

68%

Francisella tularensis

9%

Yersinia enterocolitica

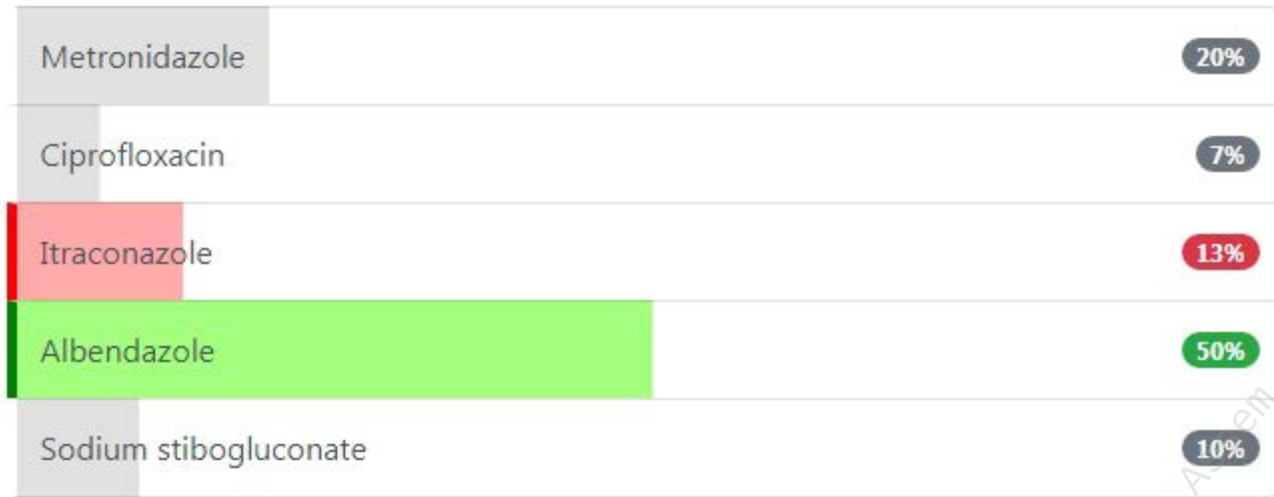
6%

Cat scratch disease - caused by *Bartonella henselae*

Important for me Less important

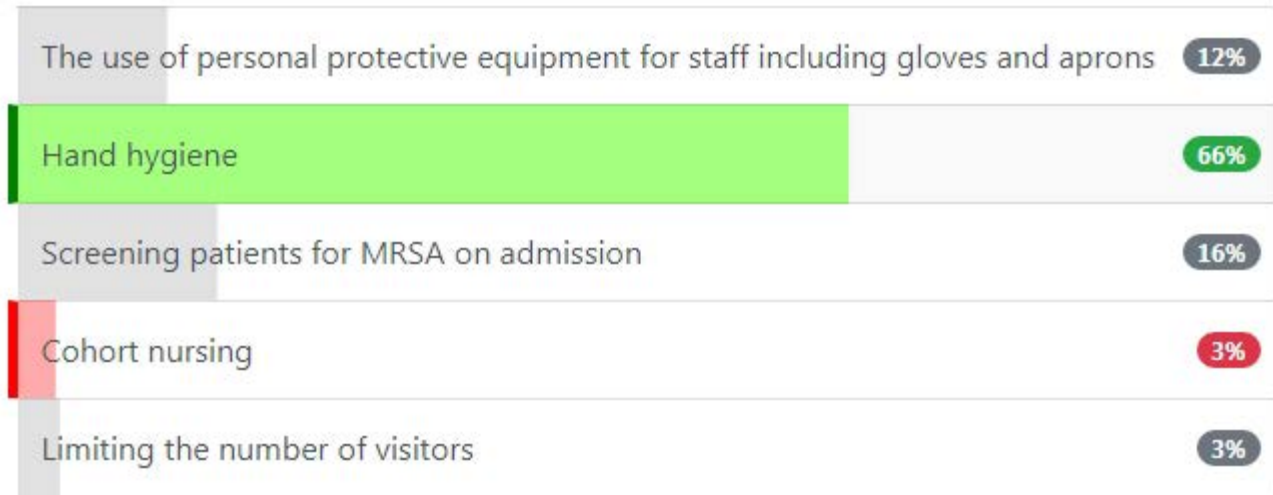
What is the first line treatment in hydatid disease?

- ☐ Metronidazole
- ☐ Ciprofloxacin
- ☐ Itraconazole
- ☐ Albendazole
- ☐ Sodium stibogluconate



You attend a meeting with the hospital management. There is currently an increased incidence of MRSA septicaemia in the hospital and a strategy is being drawn up to tackle this. What is the most effective single step to reduce the incidence of MRSA?

- ☐ The use of personal protective equipment for staff including gloves and aprons
- ☐ Hand hygiene
- ☐ Screening patients for MRSA on admission
- ☐ Cohort nursing
- ☐ Limiting the number of visitors



Whilst tackling MRSA requires a multi-pronged approach the evidence base demonstrates that hand hygiene is the single most important step

You are phoned for advice. The parents of a 19-year-old man have just been messaged by their son who is currently backpacking in Thailand. Earlier in the day he was bitten by a dog whilst staying in a rural community. Prior to travelling, he received vaccination against rabies as he was going to be visiting many rural areas. What is the most appropriate advice?

- He should increase his fluid intake by around 1L a day as a precaution
- He should be protected given the previous vaccination but should monitor for any changes in salivation over the next 72 hours
- He should see a local doctor to request antibiotic therapy
- He should urgently seek local medical attention for consideration of booster vaccination + antibiotic therapy
- He should take the next flight home so he can be observed for any symptoms of rabies

You are phoned for advice. The parents of a 19-year-old man have just been messaged by their son who is currently backpacking in Thailand. Earlier in the day he was bitten by a dog whilst staying in a rural community. Prior to travelling, he received vaccination against rabies as he was going to be visiting many rural areas. What is the most appropriate advice?

He should increase his fluid intake by around 1L a day as a precaution	4%
He should be protected given the previous vaccination but should monitor for any changes in salivation over the next 72 hours	10%
He should see a local doctor to request antibiotic therapy	10%
He should urgently seek local medical attention for consideration of booster vaccination + antibiotic therapy	73%
He should take the next flight home so he can be observed for any symptoms of rabies	4%

Rabies is nearly always fatal if untreated. Whilst you are not expected to remember all the countries where there is a high risk of rabies it is clear that being bitten by a dog in a rural area represents a risk. He needs to urgently see a local doctor as booster vaccination is indicated to minimise his risk of developing rabies. Flying home simply delays the most important intervention.

Dr Assem

A 24-year-old patient presents to the Emergency Department with watery diarrhoea. He returned from holiday in Tanzania yesterday. Which of the following pathogens is the most likely to be responsible for this presentation?

- ☐ Enterotoxigenic *E. coli*
- ☐ Non-typhoidal *Salmonella*
- ☐ *Campylobacter* spp
- ☐ *Vibrio cholerae*
- ☐ *Giardia lamblia*

Enterotoxigenic	<i>E. coli</i>	57%
Non-typhoidal	<i>Salmonella</i>	5%
<i>Campylobacter</i>	spp	6%
<i>Vibrio cholerae</i>		22%
<i>Giardia lamblia</i>		11%

All the listed options are potential causative organisms of an acute watery diarrhoeal illness.

Worldwide, enterotoxigenic *E. coli* (ETEC) is the most common cause of diarrhoea in travellers. There is, however, geographical variation - *Campylobacter* is more common in travellers in South East Asia.

Diarrhoea in cholera is classically painless, 'rice-water', stool. While cholera is seen worldwide, it is less common as a cause of diarrhoea in travellers.

Diarrhoea in acute giardiasis is classically foul-smelling and fatty, and associated with abdominal cramps and bloating. The incubation period for acute infection is one to two weeks.

Non-typhoidal *Salmonellae* are another common cause of diarrhoea worldwide. They are the most common cause of food-borne disease in the United States. The incubation period is up to three days.

A 24-year-old heterosexual man presents to GUM with a history of dysuria, urethral irritation and milky discharge from the urethra. Urethral microscopy reveals >10 polynuclear lymphocytes per field but no gonorrhoea is seen and urine dip is normal. He did a home test 3 days ago when his symptoms started and *Chlamydia* and *Gonorrhoea* NAATs were negative. His urine dipstick is normal. His last sexual encounter was 3 weeks ago. You make a clinical diagnosis of non specific urethritis (NSU).

What is the most appropriate action to take?

- ☐ Start oral doxycycline for 1 week
- ☐ Reassure the patient; his symptoms will resolve spontaneously
- ☐ Tell the patient to repeat his *Chlamydia* and *Gonorrhoea* tests in 2 weeks' time.
- ☐ Start oral aciclovir
- ☐ Refer to urology for their assessment and opinion

Start oral doxycycline for 1 week

59%

Reassure the patient; his symptoms will resolve spontaneously

13%

Tell the patient to repeat his *Chlamydia* and *Gonorrhoea* tests in 2 weeks' time.

15%

Start oral aciclovir

6%

Refer to urology for their assessment and opinion

8%

Non specific (non gonococcal) urethritis is a common presentation where inflammatory cells but no gonococcal bacteria are seen on swab; it requires treatment with doxycycline or azithromycin

Important for me Less important

The presence of pus cells on urethral swab suggests a diagnosis of non-specific urethritis, which commonly presents with symptoms similar to these. BASHH recommend treating with oral doxycycline. The window period for *Chlamydia* and *Gonorrhoea* tests is generally 2 weeks so the home test he did is likely to be accurate; while retesting may be appropriate it should not delay treatment, and should not be delayed further.

As there is no evidence of gonococcal bacteria on microscopy there is no indication to treat as *Gonorrhoea*. There is no current indication to refer to Urology and no current reason to treat the patient for HSV.

What percentage of patients who contract the hepatitis C virus will become chronically infected?

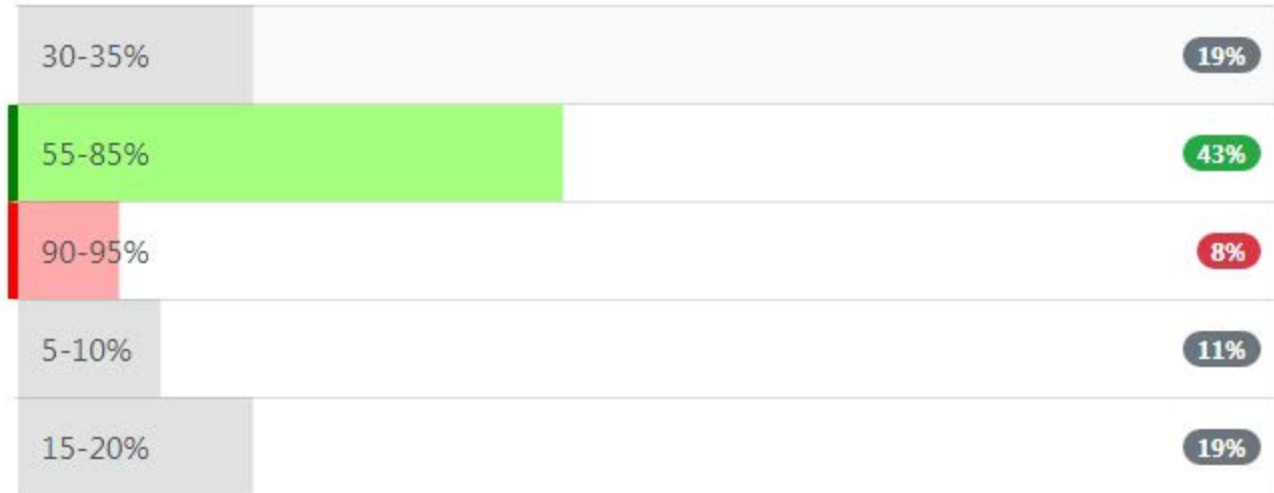
☐ 30-35%

☐ 55-85%

☐ 90-95%

☐ 5-10%

☐ 15-20%



Hepatitis C - 55-85% become chronically infected

Important for me Less important

Which one of the following is least associated with a false negative tuberculin skin test?

- ☐ Lymphoma
- ☐ Miliary tuberculosis
- ☐ Sarcoidosis
- ☐ Chronic kidney disease stage 3
- ☐ HIV

Lymphoma

8%

Miliary tuberculosis

15%

Sarcoidosis

14%

Chronic kidney disease stage 3

52%

HIV

11%

Severe renal failure may cause a false negative test but CKD stage 3 would not.

Dr Assem

Which one of the following statements regarding toxoplasmosis is true?

- ☐ It is a type of flagellate
- ☐ Congenital toxoplasmosis results in optic nerve atrophy
- ☐ Ceftriaxone should be used initially in patients with HIV-associated toxoplasmosis
- ☐ The cat is the only known animal reservoir
- ☐ infection is usually self-limiting

It is a type of flagellate

15%

Congenital toxoplasmosis results in optic nerve atrophy

27%

Ceftriaxone should be used initially in patients with HIV-associated toxoplasmosis

11%

The cat is the only known animal reservoir

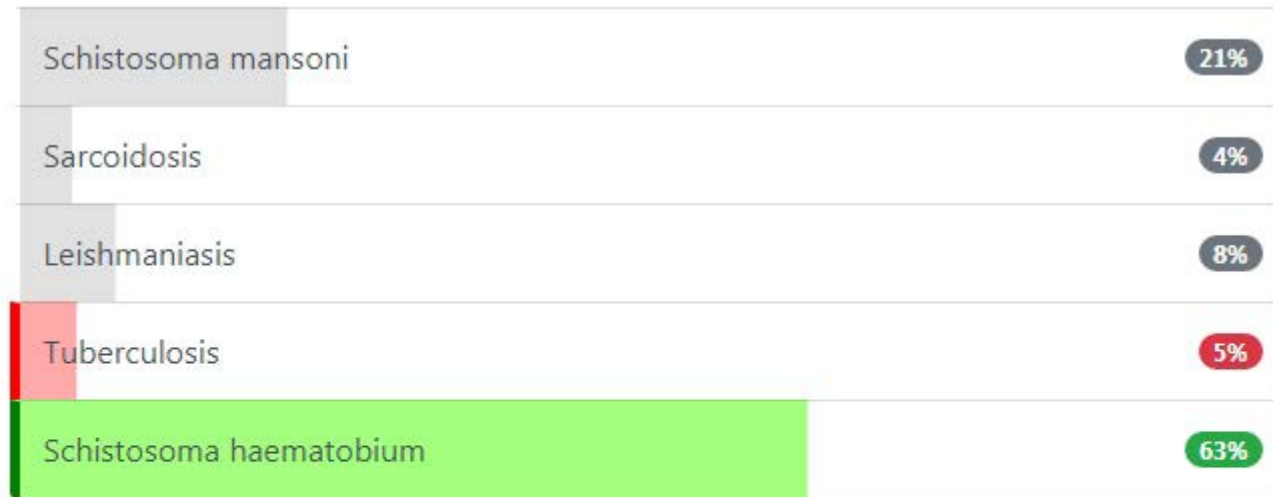
14%

infection is usually self-limiting

34%

A 34-year-old man from Zimbabwe is admitted with abdominal pain to the Emergency Department. An abdominal x-ray reveals urinary bladder calcification. What is the most likely cause?

- ☐ Schistosoma mansoni
- ☐ Sarcoidosis
- ☐ Leishmaniasis
- ☐ Tuberculosis
- ☐ Schistosoma haematobium



Schistosoma **haematobium** causes **haematuria**

Important for me Less important

Schistosomiasis is the most common cause of bladder calcification worldwide

A 28-year-old man who is immunosuppressed secondary to HIV infection is admitted to hospital with dyspnoea and a dry cough. His chest x-ray shows bilateral interstitial pulmonary infiltrates and he is started on co-trimoxazole empirically. The following morning he complains of a sudden worsening of his dyspnoea associated with left-sided chest pain. Which complication is most likely to have developed?

- ☐ Empyema
- ☐ Pulmonary embolism
- ☐ Acute respiratory distress syndrome
- ☐ Pericarditis
- ☐ Pneumothorax

Empyema

6%

Pulmonary embolism

7%

Acute respiratory distress syndrome

16%

Pericarditis

10%

Pneumothorax

61%

Pneumocystis jiroveci pneumonia - pneumothorax is a common complication

Important for me

Less important

A 39-year-old man returns from a two week business trip to Kenya. Four weeks after his return he presents complaining of malaise, headaches and night sweats. On examination there is a symmetrical erythematous macular rash over his trunk and limbs associated with cervical and inguinal lymphadenopathy. What is the most likely diagnosis?

- ☐ Typhoid fever
- ☐ Tuberculosis
- ☐ Dengue fever
- ☐ Schistosomiasis
- ☐ Acute HIV infection



Man returns from trip abroad with maculopapular rash and flu-like illness - think HIV seroconversion

Important for me Less important

Stereotypes are alive and well in the MRCP exam. For questions involving businessmen always consider sexually transmitted infections. The HIV prevalence rate in Kenya is currently around 8%.

A 20-year-old man who presented with persistent diarrhoea and abdominal bloating after returning from a gap year in Africa is diagnosed as having strongyloidiasis. How would the *Strongyloides stercoralis* organism initially entered his body?

- ☐ Sexual transmission
- ☐ Faecal-oral route
- ☐ Penetrated the skin
- ☐ Respiratory droplet route
- ☐ Mosquito vector

Sexual transmission

4%

Faecal-oral route

31%

Penetrated the skin

55%

Respiratory droplet route

4%

Mosquito vector

6%

Strongyloides stercoralis gains access to the body by penetrating the skin

Important for me Less important

This typically occurs via the soles of the feet but autoinfection in the perianal area may also occur.

A 46-year-old woman presents 3 days after returning from a safari holiday in Tanzania. She complains of fever, chills, myalgia and malaise which started 2 days ago and now complains of daytime somnolence and night time insomnia. Her husband also reports she has been acting strangely. She says she took malarone as antimalarial prophylaxis and had all the recommended vaccines before travelling. A HIV test was negative.

On examination her temperature is 38.5°C, heart rate 90/min, blood pressure 118/90 mmHg, respiratory rate 18/min.

What is the most likely diagnosis?

- ☐ Cerebral malaria
- ☐ Human African Trypanosomiasis
- ☐ Yellow fever
- ☐ Tuberculosis meningitis
- ☐ Bacterial meningitis

Cerebral malaria	13%
Human African Trypanosomiasis	74%
Yellow fever	8%
Tuberculosis meningitis	2%
Bacterial meningitis	3%

The reversal of the sleep wake cycle is typical of trypanosomiasis (African sleeping sickness) and can be accompanied by behavioural changes. Cerebral malaria would be unlikely given that she took malarone and reversal of the sleep-wake cycle would not be a feature. TB meningitis is also very unlikely in this lady, especially in the absence of HIV or other immunosuppressive illness. Bacterial meningitis again does not cause reversal of the sleep-wake cycle and the onset is quite long for bacterial meningitis. Yellow fever is found in Tanzania (although the risk is low) and the initial symptoms may be similar but the later stages involve jaundice, abdominal pain and bleeding not behavioural and sleep disturbances.

A 17-year-old man attends the local sexual health clinic. He has developed a large, keratinised genital wart on the shaft of his penis. This has been present for around three months but he has been too embarrassed to present before now. What is the most appropriate initial management?

- ☐ Topical aciclovir
- ☐ Cryotherapy
- ☐ Topical salicylic acid
- ☐ Electrocautery
- ☐ Topical podophyllum

Topical aciclovir

5%

Cryotherapy

56%

Topical salicylic acid

4%

Electrocautery

7%

Topical podophyllum

28%

Genital wart treatment

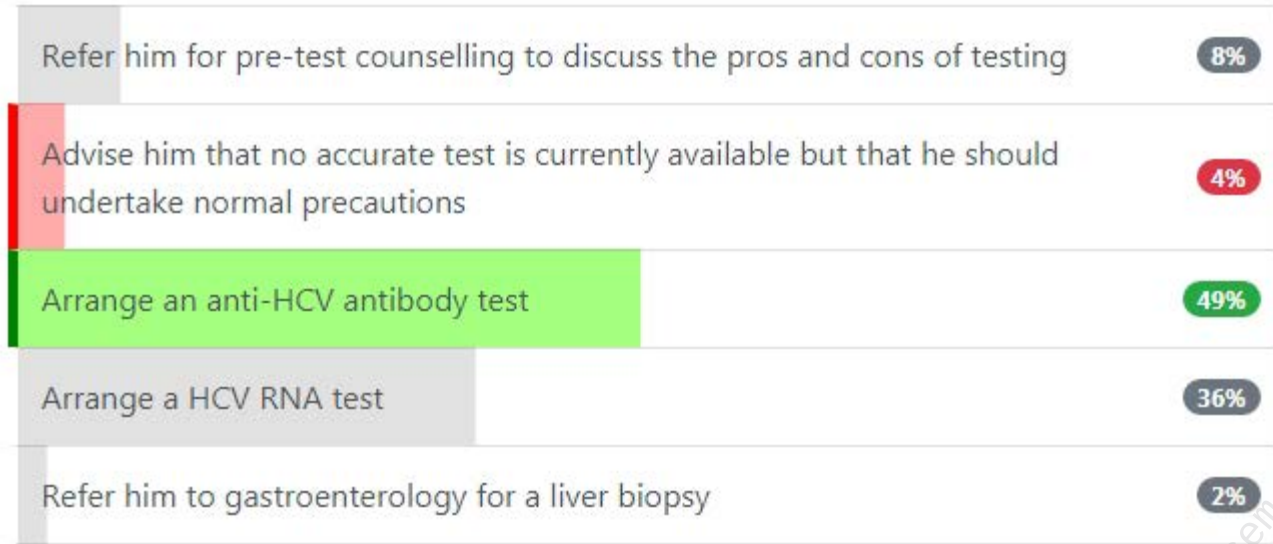
- multiple, non-keratinised warts: topical podophyllum
- solitary, keratinised warts: cryotherapy

Important for me Less important

As the wart is keratinised cryotherapy should be used initially

A patient who was an intravenous drug user in the 1990s asks for a hepatitis C test. What is the most appropriate action?

- ☐ Refer him for pre-test counselling to discuss the pros and cons of testing
- ☐ Advise him that no accurate test is currently available but that he should undertake normal precautions
- ☐ Arrange an anti-HCV antibody test
- ☐ Arrange a HCV RNA test
- ☐ Refer him to gastroenterology for a liver biopsy



HCV RNA tests are normally only ordered following a positive antibody test.

A 32-year-old woman attends the emergency department 8 days after returning from a Safari holiday in Uganda with headache, fever, muscle pains and malaise. She admits she did not have any vaccinations before she went and did not take antimalarial prophylaxis. She has no past medical history and is not taking any other medications.

Her temperature is 39.5°C, blood pressure 100/70 mmHg, heart rate 110/min, respiratory rate 20 breaths/min, oxygen saturations 98% on air. Her blood sugar is 2.8 mmol/L.

Her blood film shows *P. falciparum* with 5% parasitaemia

How would you treat her?

- ☐ Oral artesunate combination therapy
- ☐ Oral chloroquine
- ☐ IV artesunate
- ☐ IV mefloquine
- ☐ IV quinine

Oral artesunate combination therapy	15%
Oral chloroquine	9%
IV artesunate	54%
IV mefloquine	10%
IV quinine	12%

This lady has severe falciparum malaria as she has a high parasitaemia ($>2\%$), hypoglycaemia and a high temperature. The latest WHO guidelines recommend IV artesunate as 1st line treatment for severe falciparum malaria. IV quinine can be used if artesunate is not available but is inferior to artesunate. Chloroquine should be used with caution as there is high level of chloroquine resistance in some areas of the world. If she had non-severe falciparum malaria then artesunate combination therapy should be used.

Criteria for severe falciparum malaria

- High parasitaemia ($>2\%$)
- Hypoglycaemia
- Severe anaemia
- Renal failure
- Pulmonary oedema
- Metabolic acidosis
- Abnormal bleeding
- Multiple convulsions
- Seizures
- Shock

Management

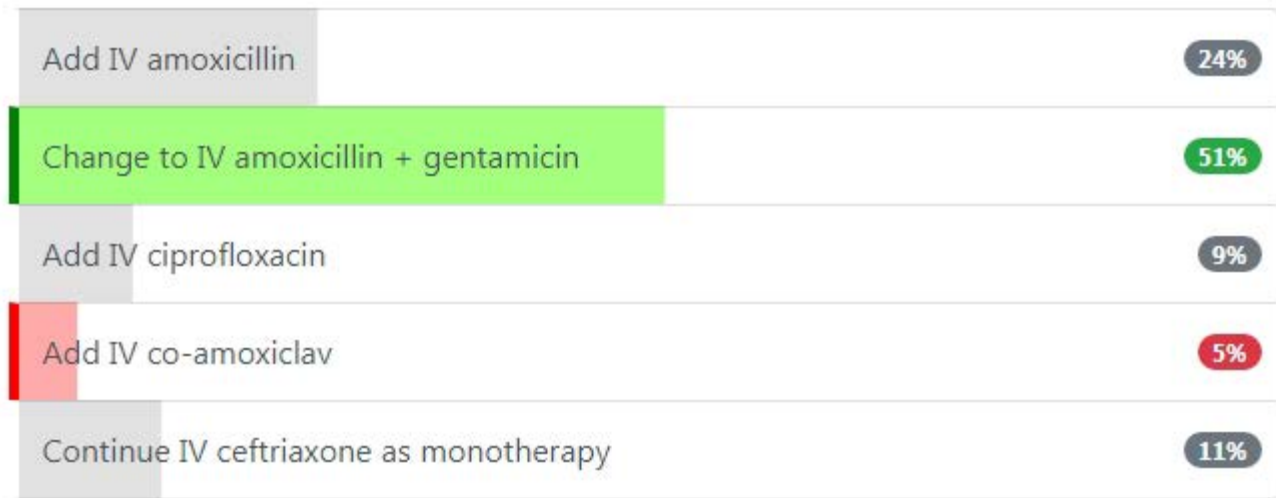
- Severe falciparum, malaria IV artesunate
- Non-severe falciparum malaria oral artesunate combination therapy (ACT)
- Non-falciparum malaria oral ACT or chloroquine if not resistant

Sources: WHO management of severe malaria

<http://apps.who.int/iris/bitstream/10665/79317/1/9789241548526eng.pdf?ua=1>

A 74-year-old female presents with headache and neck stiffness to the Emergency Department. Following a lumbar puncture the patient was started on IV ceftriaxone. CSF culture grows *Listeria monocytogenes*. What is the most appropriate treatment?

- ☐ Add IV amoxicillin
- ☐ Change to IV amoxicillin + gentamicin
- ☐ Add IV ciprofloxacin
- ☐ Add IV co-amoxiclav
- ☐ Continue IV ceftriaxone as monotherapy



The current BNF suggests treatment with amoxicillin/ampicillin + gentamicin. Treatment should be for at least 10-14 days

A 26-year-old man presents to your sexual health clinic with a history of swollen inguinal lymph nodes and fever 1 month after he had receptive anal intercourse with a casual male partner. He tells you his last HIV test was 2 months previously and this is the only sexual contact he has had in the last 6 months.

What is the most appropriate course of action to determine his HIV status?

- ☐ Advise the patient it is too early to test for HIV; ask him to return in 2 weeks and then at 3 months
- ☐ Request a combined antigen (P24) and antibody test
- ☐ Ask the patient to return in 2 months for an RNA PCR test
- ☐ Perform a bedside 'Point of Care' antibody only test and reassure the patient if this is normal
- ☐ Take a full blood count for CD4 count

Advise the patient it is too early to test for HIV; ask him to return in 2 weeks and then at 3 months

10%

Request a combined antigen (P24) and antibody test

72%

Ask the patient to return in 2 months for an RNA PCR test

6%

Perform a bedside 'Point of Care' antibody only test and reassure the patient if this is normal

5%

Take a full blood count for CD4 count

7%

p24 testing can be used 4 week after an exposure and is often used in combination with the HIV antibody test in clinical practice

Important for me Less important

A combined p24/Antibody test is the most appropriate test used in clinical practice as this has a 4 week window period. Bedside antibody only test may not be accurate for a recent risk less than 6 weeks ago. RNA PCR is sometimes used as a screening test but there is no reason to delay testing. CD4 count needs to be checked should the patient be HIV positive but will not give you any information about his HIV status

A 23-year-old man is admitted to the Emergency Department with an evolving purpuric rash, pyrexia and confusion. His GP had given him intramuscular benzylpenicillin in the surgery and dialled 999. Which one of the following investigations is most likely to reveal the diagnosis?

- ☐ Urinary antigen
- ☐ Blood PCR for meningococcus
- ☐ Blood culture
- ☐ CT head
- ☐ Lumbar puncture



The blood cultures are likely to be negative as antibiotics have already been given. PCR has a sensitivity of over 90%.

A 34-year-old female is admitted to hospital with fever, rigors and myalgia. She reports being bitten by her rabbit 4 days prior.

On examination, you notice an ulcer around the site of the bite with tender regional lymphadenopathy. On closer inspection of the lymph nodes, you notice pus coming out from them.

Blood tests reveal:

Hb	119 g/l
Platelets	$153 \times 10^9/l$
WBC	$12.4 \times 10^9/l$
Na ⁺	128 mmol/l
K ⁺	3.7 mmol/l
Urea	11.3 mmol/l
Creatinine	187 mol/l
Bilirubin	30 mol/l
ALP	85 u/l
ALT	111 u/l
Albumin	37 g/l
Creatine kinase	831 iu/L

What is the most likely diagnosis?

- ☐ Legionella
- ☐ Mycoplasma pneumonia
- ☐ Tularaemia
- ☐ Psittacosis
- ☐ Leptospirosis

Legionella

10%

Mycoplasma pneumonia

4%

Tularaemia

50%

Psittacosis

15%

Leptospirosis

22%

Tularaemia is a zoonotic infection involving the microorganism *F. tularensis* commonly transmitted through lagomorphs such as rabbits, hares and pikas but also in aquatic rodents - beavers and muskrat - and ticks. It can present in a variety of forms. Commonly, it produces an erythematous papulo-ulcerative lesion at the site of the bite with reactive and ulcerating regional lymphadenopathy. It is treated with antibiotics such as doxycycline.

Psittacosis, legionella and mycoplasma tend to present with an atypical pneumonic pattern. Leptospirosis is associated with contact with vermin and can present with liver involvement associated with thrombocytopaenia and an acute kidney injury which is not mentioned here.

A 54-year-old man presents to a sexual health clinic with positive serology for syphilis, which was found during routine work up for an insurance medical. He travels a great deal for work and states he has on occasion paid for sex with male sex workers in Thailand. He has never had a syphilis test before and is very shocked as he feels well and is completely asymptomatic. He is reluctant to have treatment for his syphilis as he feels very well and asks you how he can have syphilis if he doesn't have symptoms.

Which of the following should you advise him?

- ☐ Asymptomatic (latent) infection implies late disease
- ☐ Symptomatic syphilis requires repeated antibiotic treatments; latent disease requires a one off treatment only
- ☐ Spontaneous clearance of *Treponema pallidum* does not occur
- ☐ Only symptomatic patients need treatment for syphilis
- ☐ Almost all patients with syphilis will describe a chancre as their first symptom

Asymptomatic (latent) infection implies late disease

21%

Symptomatic syphilis requires repeated antibiotic treatments; latent disease requires a one off treatment only

12%

Spontaneous clearance of *Treponema pallidum* does not occur

43%

Only symptomatic patients need treatment for syphilis

5%

Almost all patients with syphilis will describe a chancre as their first symptom

18%

Latent syphilis (i.e asymptomatic syphilis) can occur at an early and a late stage and requires the same antibiotic treatment

Important for me Less important

Syphilis can be present without any symptoms at either an early or a late stage; these are called 'early latent' (less than 2 years since last negative syphilis test) and 'late latent' (more than 2 years since last negative test). Whether the syphilis is latent or causing symptoms does not alter the treatment; this is only affected by whether syphilis has not been tested for in the last 2 years, in which case further doses are required, or if neurosyphilis is suspected. Many patients with syphilis are unaware of having had a chancre and this is sometimes picked up incidentally on clinical examination. There is no known clearance of *Treponema pallidum* without antibiotic treatment

A 24-year-old student returns from a gap year in Malawi complaining of visible haematuria, dysuria and urinary frequency. She says she felt well throughout her trip but experienced an itchy rash on her legs a few hours after swimming in Lake Malawi which has now resolved.

Her blood results show:

Hb	98 g/l
Platelets	$150 \times 10^9/l$
WBC	$9.0 \times 10^9/l$
Neutrophils	$4.0 \times 10^9/l$
Lymphocytes	$2.5 \times 10^9/l$
Eosinophils	$0.5 \times 10^9/l$

How would you treat her?

- ☐ Albendazole
- ☐ Trimethoprim
- ☐ Prednisolone
- ☐ Doxycycline
- ☐ Praziquantel

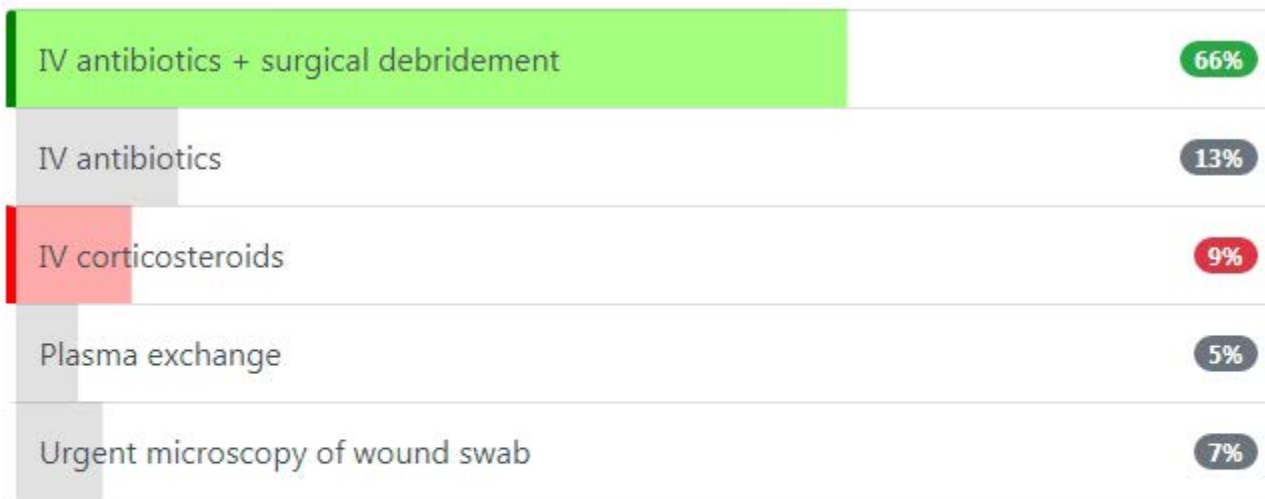


This woman is likely to have schistosoma haematobium (schistosomiasis/bilharzia) from the symptoms and raised eosinophils. She has also swam in Lake Malawi which is a big risk factor for getting schistosomiasis. The schistosoma parasite enters the skin from the water which can cause an initial itch as in the case followed by symptoms above. It is treated with praziquantel. Albendazole is another anti-parasitic drug but is not used in schistosomiasis. Doxycycline may be used to treat chlamydia but this is unlikely, Trimethoprim would be used to treat a UTI but this is unlikely due to the presentation and raised eosinophils. Glomerulonephritis may present in a similar way to this and is treated with prednisolone in some cases but again the initial itch and raised eosinophils point more toward schistosomiasis.

Source: WHO

A 45-year-old man presents to the Emergency Department due to severe pain in the perineal area over the past 6 hours. On examination the skin is cellulitic, extremely tender and haemorrhagic bullae are seen. What is the most appropriate management?

- ☐ IV antibiotics + surgical debridement
- ☐ IV antibiotics
- ☐ IV corticosteroids
- ☐ Plasma exchange
- ☐ Urgent microscopy of wound swab



Surgical referral is the single most important step in the management of necrotising fasciitis. There has been little change in the mortality of necrotising fasciitis since the introduction of antibiotics

A 65-year-old man who has recently move to the UK from India presents with multiple pale patches on his skin. He has no previous medical problems and is not taking any medications. On examination he has 10 hypopigmented patches with reduced sensation. You suspect lepromatous leprosy.

What is the most appropriate treatment?

- ☐ Rifampicin, dapsone and clofazimine for 12 months
- ☐ Dapsone, ethambutol and pyrazinamide for 12 months
- ☐ Dapsone and ethambutol for 6 months
- ☐ Rifampicin and isoniazid for 6 month
- ☐ Rifampicin and dapsone for 6 months

Rifampicin, dapsone and clofazimine for 12 months	51%
Dapsone, ethambutol and pyrazinamide for 12 months	16%
Dapsone and ethambutol for 6 months	10%
Rifampicin and isoniazid for 6 month	6%
Rifampicin and dapsone for 6 months	17%

This man has multibacillary leprosy (>6 lesions) so should have triple therapy with rifampicin, dapsone and clofazimine for 12 months. For paucibacillary leprosy (5 or less lesions) you should give rifampicin and dapsone for 6 months.

Source: BNF

A 34-year-old man from West Africa is admitted due to confusion associated with left-sided weakness and ataxia. He is known to be HIV positive but is not on anti-retroviral treatment. The following results are obtained:

CD4	43 μ /l
CT head	Low attenuation diffusely. No mass effect or enhancement

What is the most likely diagnosis?

- ☐ Toxoplasmosis
- ☐ Tuberculosis
- ☐ Progressive multifocal leukoencephalopathy
- ☐ *Cryptococcus*
- ☐ Cerebral lymphoma

Toxoplasmosis

9%

Tuberculosis

5%

Progressive multifocal leukoencephalopathy

60%

Cryptococcus

18%

Cerebral lymphoma

8%

HIV, neuro symptoms, widespread demyelination - progressive multifocal leukoencephalopathy

Important for me

Less important

A 69-year-old man is brought into the emergency department by ambulance, with a few days history of increasing shortness of breath, fever and a productive cough.

On review, you find:

HR	105 bpm
Oxygen saturation	90 % on air
BP	100/65 mmHg
Temp	38.9°C
Respiratory Rate	32 breaths per minute
Chest X-ray	Right mid-zone cavity with surrounding consolidation

The patient is started on oxygen, antibiotics and IV fluids and his observations improve to the point where taking a history is easier. He reports that he normally keeps fit and has no other long-term health conditions, but that he has been more tired for the past few weeks. He explains further that he and his wife both caught a 'bad cold' from their grandchildren about a month ago.

What is the most likely cause for this gentleman's symptoms?

- ☐ Lung cancer
- ☐ *Klebsiella pneumoniae* infection
- ☐ *Staphylococcus aureus* infection
- ☐ Pulmonary tuberculosis
- ☐ *Streptococcus pneumoniae* infection

Lung cancer		4%
<i>Klebsiella pneumoniae</i>	infection	14%
<i>Staphylococcus aureus</i> infection		49%
Pulmonary tuberculosis		7%
<i>Streptococcus pneumoniae</i>	infection	26%

Staphylococcus aureus is associated with cavitating lesions when it causes pneumonia

Important for me Less important

This gentleman likely developed influenza a few weeks prior to his presentation at the emergency department, which is associated with the development of *S. aureus* pneumonia following resolution.

S. aureus is associated with the development of cavitating lung lesions in the context of pneumonia, especially when caused by strains capable of producing a cytotoxin known as Panton-Valentine Leukocidin. This cytotoxin can often lead necrotic, hemorrhagic pneumonia and length stays in intensive care units for the patients affected.

Although lung cancer, *Klebsiella pneumoniae*, and pulmonary tuberculosis are all associated with cavitating lung lesions, these causes are less likely for the following reasons:

- Squamous cell carcinoma is the most common oncological cause of cavitating lung lesions, which is often linked to a history of smoking. The question gives us no information to suggest the patient is a smoker.
- *Klebsiella pneumoniae* is often associated a causative pathogen of pneumonia in patients with a history of alcoholism
- Pulmonary tuberculosis often causes a more drawn out, subacute presentation and is often associated with immunosuppression and other comorbidities

Streptococcus pneumoniae is not associated with cavitating lung lesions.

A 50-year-old man is admitted with sepsis of unknown origin. He has had three sets of blood cultures taken. The microbiology laboratory phone the ward with some preliminary results about a bacterium growing from the first set of cultures. Which of the following findings would make you concerned that the bacterium isolated is *Staph aureus*?

- ☐ Bacteria seen in diplococci pairs
- ☐ Poor uptake of gram stain
- ☐ Coagulase test positive
- ☐ Rapid growth on MacConkey agar
- ☐ Haemolysis on blood agar

Bacteria seen in diplococci pairs	11%
Poor uptake of gram stain	3%
Coagulase test positive	71%
Rapid growth on MacConkey agar	7%
Haemolysis on blood agar	8%

Staph aureus is a coagulase positive Staph

Important for me Less important

The coagulase test is used to differentiate between different *Staphylococcus* species and often returns from the lab before determination of the exact species. *Staph aureus* is the most important of the coagulase positive *Staphylococcus* species and is highly pathogenic. Coagulase-negative *Staph* species are most likely to be skin commensal organisms of relatively low pathogenicity, such as *Staph epidermidis* or *Staph saprophyticus*, although some may still cause deeper infection or sepsis.

Which one of the following is the most likely presentation of *Staphylococcus aureus* food poisoning?

- ☐ Tenesmus
- ☐ Watery diarrhoea
- ☐ Dysentery
- ☐ Severe vomiting
- ☐ Presentation 24-48 hours after eating affected food

Tenesmus

3%

Watery diarrhoea

9%

Dysentery

4%

Severe vomiting

65%

Presentation 24-48 hours after eating affected food

18%

Severe nausea and vomiting are caused by enterotoxins A-E

Infection with *Schistosoma haematobium* is most strongly associated with:

- ☐ Transitional cell bladder cancer
- ☐ Lung cancer
- ☐ Hepatoma
- ☐ Vulval carcinoma
- ☐ Squamous cell bladder cancer

Transitional cell bladder cancer

32%

Lung cancer

5%

Hepatoma

8%

Vulval carcinoma

5%

Squamous cell bladder cancer

50%

Schistosomiasis is a risk factor for **S**quamous cell bladder cancer

Important for me

Less important

A patient is prescribed zanamivir (Relenza) for suspected influenza. Which one of the following underlying problems may increase the likelihood of side-effects?

- ☐ A history of aspirin sensitivity
- ☐ Epilepsy
- ☐ Asthma
- ☐ Renal impairment
- ☐ Concurrent use with drugs that prolong the QT interval

A history of aspirin sensitivity

11%

Epilepsy

13%

Asthma

38%

Renal impairment

20%

Concurrent use with drugs that prolong the QT interval

18%

Zanamivir (Relenza) may induce bronchospasm in asthmatics.

Dr Assem

A 48-year-old man with a past medical history of poorly controlled HIV is admitted with shortness of breath. He also complains of haemoptysis. Imaging and blood tests confirm a diagnosis of invasive aspergillosis. He is treated with amphotericin B.

What is the mechanism of action of amphotericin B?

- ☐ Inhibits DNA polymerase
- ☐ Converted to 5-fluorouracil
- ☐ Binds with ergosterol
- ☐ Inhibits synthesis of beta-glucan
- ☐ Interacts with microtubules to disrupt mitotic spindle

Inhibits DNA polymerase	13%
Converted to to 5-fluorouracil	10%
Binds with ergosterol	38%
Inhibits synthesis of beta-glucan	17%
Interacts with microtubules to disrupt mitotic spindle	22%

Amphotericin B binds with ergosterol, a component of fungal cell membranes, forming pores that cause lysis of the cell wall and subsequent fungal cell death

Important for me Less important

Amphotericin B binds with ergosterol, a component of fungal cell membranes, forming pores that cause lysis of the cell wall and subsequent fungal cell death.

Flucytosine is converted by cytosine deaminase to 5-fluorouracil, which inhibits thymidylate synthase and disrupts fungal protein synthesis.

Caspofungin inhibits synthesis of beta-glucan, a major fungal cell wall component.

Griseofulvin interacts with microtubules to disrupt mitotic spindle.

Anti viral agents such as aciclovir inhibit viral DNA polymerase.

A 74-year-old woman has a chest x-ray organised by her GP due to a chronic cough. The chest x-ray shows a cavity in the left upper zone inside of which there is a solid mass. An aspergilloma is suspected. What is the most appropriate next test?

- ☐ Sputum culture
- ☐ Serology for Aspergillus precipitins
- ☐ Blood culture
- ☐ Bronchoscopy with biopsy
- ☐ Transthoracic fine needle biopsy

Sputum culture

6%

Serology for Aspergillus precipitins

58%

Blood culture

3%

Bronchoscopy with biopsy

28%

Transthoracic fine needle biopsy

5%

A 34-year-old lady presents to the GP with worsening nausea and fatigue over a 2 week period. On examination, there is a yellow tinge to the sclera of her eyes. She lives in a remote fishing village and consumes a diet high in seafood. She does not smoke or consume alcohol. She does not report any weight loss or other constitutional features. Her LFTs are as follows:

Bilirubin	20 $\mu\text{mol/l}$
ALP	160 u/l
ALT	550 u/l
γGT	30 u/l
Albumin	35 g/l

Other routine blood results are within normal limits.

What is the most likely cause of her symptoms?

- ☐ Gilbert's syndrome
- ☐ Pancreatic adenocarcinoma
- ☐ Hepatitis B
- ☐ Hepatitis C
- ☐ Hepatitis E

Gilbert's syndrome	13%
Pancreatic adenocarcinoma	6%
Hepatitis B	7%
Hepatitis C	6%
Hepatitis E	67%

Hepatitis E is associated with faecal-oral spread, commonly affecting shellfish and pork products. Blood results show elevated bilirubin and significant transaminitis.

This lady has no constitutional symptoms, making a pancreatic adenocarcinoma less likely. As well, pancreatic cancer rarely occurs before age 40.

Hepatitis B and C are blood-borne viruses and there is no relevant history in this lady's case.

Which one of the following tests is most likely to remain positive in a patient with syphilis despite treatment?

- ☐ Wassermann reaction
- ☐ Rapid plasma reagin (RPR)
- ☐ Venereal disease research laboratory (VDRL)
- ☐ Blood culture
- ☐ *Treponema pallidum* haemagglutination test (TPHA)

Wassermann reaction

4%

Rapid plasma reagin (RPR)

11%

Venereal disease research laboratory (VDRL)

31%

Blood culture

3%

Treponema pallidum

haemagglutination test (TPHA)

50%

A 31-year-old man from Russia who is known to be HIV positive presents with purple plaques on his skin. Which of the following viruses is thought to be the cause of Kaposi's sarcoma?

☐ HTLV-1

☐ HIV-2

☐ HHV-8

☐ CMV

☐ HPV-8

HTLV-1

8%

HIV-2

7%

HHV-8

64%

CMV

7%

HPV-8

15%

Kaposi's sarcoma - caused by HHV-8 (human herpes virus 8)

Important for me Less important

A 33-year-old man who is HIV positive is admitted to the Emergency Department with confusion and drowsiness. He has been complaining of headaches for a number of days. On examination heart rate is 90/min, blood pressure 104/78 mmHg and temperature is 37.2°C. He is confused giving a Glasgow Coma Scale (GCS) score of 14. There is no photophobia or neck stiffness.

His infectious diseases consultant reports that he is prescribed highly active antiretroviral treatment (HAART) but his compliance is poor and he often misses clinic appointments.

A CT brain is requested:

CT brain (with contrast): Multiple hypodense regions predominantly in the basal ganglia which show ring enhancement. Minimal surrounding oedema. No mass effect.

What is the most likely diagnosis?

- ☐ Progressive multifocal leukoencephalopathy
- ☐ Cryptococcal infection
- ☐ Cerebral toxoplasmosis
- ☐ CMV encephalitis
- ☐ Tuberculosis

Progressive multifocal leukoencephalopathy

14%

Cryptococcal infection

5%

Cerebral toxoplasmosis

73%

CMV encephalitis

5%

Tuberculosis

3%

HIV, neuro symptoms, multiple brain lesions with ring enhancement -
toxoplasmosis

Important for me Less important

Cerebral toxoplasmosis is the most common neurological infection seen in HIV, occurring in up to 10% of patients

A 12-year-old girl is prescribed oseltamivir for suspected influenza. What is the mechanism of action of oseltamivir?

- ☐ Inhibits RNA polymerase
- ☐ Interferes with the capping of viral mRNA
- ☐ Neuraminidase inhibitor
- ☐ Inhibits DNA polymerase
- ☐ Protease inhibitor

Inhibits RNA polymerase

13%

Interferes with the capping of viral mRNA

13%

Neuraminidase inhibitor

54%

Inhibits DNA polymerase

9%

Protease inhibitor

11%

A woman who is 14 weeks pregnant presents as she came into contact with a child who has chickenpox around 4 days ago. She is unsure if she had the condition herself as a child. Blood tests show the following:

Varicella IgM	Negative
Varicella IgG	Negative

What is the most appropriate management?

- ☐ Varicella zoster immunoglobulin
- ☐ No action required
- ☐ IV aciclovir
- ☐ Varicella zoster vaccination
- ☐ Varicella zoster vaccination + varicella zoster immunoglobulin

Varicella zoster immunoglobulin

40%

No action required

13%

IV aciclovir

4%

Varicella zoster vaccination

10%

Varicella zoster vaccination + varicella zoster immunoglobulin

33%

Chickenpox exposure in pregnancy - if not immune give VZIG

Important for me Less important

The negative IgG indicates no previous exposure to chickenpox

A patient who has recently returned from the Ivory Coast presents with cyclical fever and headache. He is found to have splenomegaly on examination. Following a blood film he is diagnosed as having *Plasmodium vivax* malaria. He is treated initially with chloroquine then later given primaquine. What is the benefit of the primaquine?

- ☐ Destroy liver hypnozoites and prevent relapse
- ☐ Reduce the risk of chloroquine-related retinopathy
- ☐ Reduce the incidence of chloroquine resistance
- ☐ Cover *Plasmodium ovale* in case of co-infection
- ☐ Prevent immature trophozoites forming gamatocytes

Destroy liver hypnozoites and prevent relapse

74%

Reduce the risk of chloroquine-related retinopathy

4%

Reduce the incidence of chloroquine resistance

9%

Cover *Plasmodium ovale* in case of co-infection

5%

Prevent immature trophozoites forming gamatocytes

8%

Primaquine is used in non-falciparum malaria to destroy liver hypnozoites and prevent relapse

Important for me Less important

A 45-year-old butcher from Poland presents to your clinic with a history of a painful bump on the back of his hand that he describes as 'like an insect bite' that has since ulcerated and scabbed over. He is concerned it could be a form of skin tumour as the scab is black and hard. The scab is painless but he has some tender lumps in his axilla. He is normally fit and well and has no systemic symptoms.

What is the most appropriate management?

- ☐ Ciprofloxacin
- ☐ Metronidazole
- ☐ Flucloxacillin
- ☐ Clotrimazole
- ☐ Doxycycline

Submit answer

Dr Assem

Anthrax presents with a black eschar that is typically painless; it is treated with ciprofloxacin

Important for me [Less important](#)

The question stem gives a classical history of a black eschar characteristically seen in cutaneous anthrax. The patient has 2 risk factors for the disease (being a butcher and hailing from Eastern Europe).

The most common treatment for cutaneous anthrax is ciprofloxacin.

Anthrax (*Bacillus anthracis*) is a spore-forming gram-positive rod and gram stain would be a sensible initial test whilst awaiting confirmatory test.



[Next question >](#)

Anthrax

Anthrax is caused by *Bacillus anthracis*, a Gram positive rod. It is spread by infected carcasses. It is also known as Woolsorters' disease. *Bacillus anthracis* produces a tripartite protein toxin

- protective antigen
- oedema factor: a bacterial adenylate cyclase which increases cAMP
- lethal factor: toxic to macrophages

Features

- causes painless black eschar (cutaneous 'malignant pustule', but no pus)
- typically painless and non-tender
- may cause marked oedema
- anthrax can cause gastrointestinal bleeding

Management

- the current Health Protection Agency advice for the initial management of cutaneous anthrax is ciprofloxacin
- further treatment is based on microbiological investigations and expert advice

Dr Assem

A 28-year-old woman presents to the hospital with severe neck pain, shortness of breath and swelling around her left jaw,, on a background of a week's history of pharyngitis, with some difficulty swallowing. She is normally fit and well, has no recent foreign travel and is fully vaccinated. She works as a doctor and had been unable to attend her own GP.

On examination, she is tachycardic and hypotensive. There is unilateral cervical lymphadenopathy and she has significant tonsillar swelling. Her chest is clear.

You suspect Lemierre's syndrome.

Which one of the following sequelae is the patient at high risk of?

- ☐ Internal carotid artery dissection
- ☐ Septic pulmonary emboli
- ☐ Digital ischaemia
- ☐ Myocardial infarction
- ☐ Amaurosis fugax

Submit answer

Internal carotid artery dissection	31%
Septic pulmonary emboli	38%
Digital ischaemia	7%
Myocardial infarction	6%
Amaurosis fugax	17%

Patients with peritonsillar abscesses can develop Lemierre's syndrome (thrombophlebitis of the IJV)- this can present with neck pain, and can result in septic pulmonary embolism

Important for me [Less important](#)

Patients with peritonsillar abscesses can develop Lemierre's syndrome (thrombophlebitis of the internal jugular vein)- this can present with neck pain and can result in septic pulmonary embolism.

The commonest bacterial cause of Lemierre's syndrome is *Fusobacterium*. *Coxiella burnetii* causes Q fever.

Treatment is with IV antibiotics.

Patients with Lemierre's syndrome often have high fevers (39-41°C).

As Lemierre's syndrome involves venous thrombophlebitis of the external jugular vein, digital ischaemia, amaurosis fugax and myocardial infarction are less likely than pulmonary emboli.



 Discuss

Improve

[Next question >](#)

Lemierre's syndrome

Lemierre's syndrome is an infectious thrombophlebitis of the internal jugular vein.

It most often occurs secondary to a bacterial sore throat caused by *Fusobacterium necrophorum* leading to a peritonsillar abscess. A combination of spread of the infection laterally from the abscess and compression lead to thrombosis of the IJV.

Patients will present with a history of bacterial sore throat followed by neck pain, stiffness and tenderness (may be mistaken for meningitis) and systemic involvement (fevers, rigors, etc).

A 19-year-old woman presents to the emergency department with a history of confusion, severe malaise, vomiting, fever and a 'sunburn like' rash involving her upper body, palms, soles and lips.

She is normally fit and well. Her only past medical history of note is menorrhagia; she has been referred by her GP to gynaecology regarding this. She takes tranexamic acid as required. She recently returned from a holiday in Ibiza.

On examination, she is pyrexial, hypotensive, and has diffuse macular erythroderma with red oral mucosa. Glasgow coma scale 14/15, her neurological examination is normal. Her chest is clear and abdomen is non-tender.

Initial blood tests find elevated creatinine kinase, an elevated creatinine level and deranged liver function tests.

Blood cultures are positive for *Staphylococcus aureus*.

Other microbiological tests are negative including serology for rickettsia, leptospirosis, and measles.

Which of the following factors is most likely to be contributory to this patient's presentation?

- ☐ Underlying pneumonia
- ☐ Recent foreign travel
- ☐ Tampon use
- ☐ Excess alcohol consumption
- ☐ Cellulitis secondary to eczema

Submit answer

Underlying pneumonia	9%
Recent foreign travel	13%
Tampon use	57%
Excess alcohol consumption	10%
Cellulitis secondary to eczema	10%

Tampon use is a risk factor for staphylococcal toxic shock syndrome

Important for me Less important

The stem is describing toxic shock syndrome secondary to *Staphylococcus aureus* infection.

Tampon use is a major risk factor for this illness; particularly the use of tampons for prolonged periods of time.

Pneumonia and skin infections are also associated with toxic shock syndrome but are less likely in this case as there are no signs of them on clinical examination.

Foreign travel and alcohol consumption are not linked to toxic shock syndrome.




 Discuss (1)

 Improve

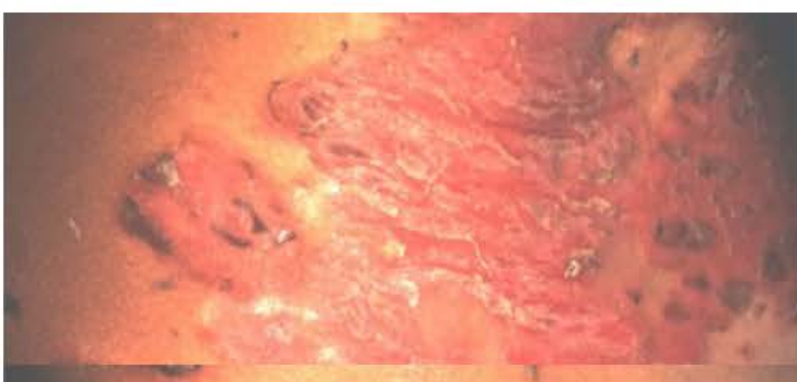
Next question >

Staphylococcal toxic shock syndrome

Staphylococcal toxic shock syndrome describes a severe systemic reaction to staphylococcal exotoxins. It came to prominence in the early 1980's following a series of cases related to infected tampons

Centers for Disease Control and Prevention diagnostic criteria

- fever: temperature $> 38.9^{\circ}\text{C}$
- hypotension: systolic blood pressure < 90 mmHg
- diffuse erythematous rash
- desquamation of rash, especially of the palms and soles
- involvement of three or more organ systems: e.g. gastrointestinal (diarrhoea and vomiting), mucous membrane erythema, renal failure, hepatitis, thrombocytopenia, CNS involvement (e.g. confusion)



© Image used on license from DermNet NZ



Dr Assem

After a trip to a petting zoo, a 78-year-old woman presents with severe watery diarrhoea leading to dehydration, mild fever and cramping mild abdominal pains. She is normally fit and well and is treated with IV fluids.

You later hear reports that several others became unwell after visiting the same site. You are contacted by Public Health England who suspect cryptosporidiosis and ask you to perform tests to confirm this.

What test is most appropriate for this purpose?

- ☐ Blood film
- ☐ Ziehl-Neelsen staining on stool sample
- ☐ Stool culture
- ☐ Blood culture
- ☐ No diagnostic test available

Submit answer

Blood film	9%
Ziehl-Neelsen staining on stool sample	41%
Stool culture	31%
Blood culture	8%
No diagnostic test available	11%

Cryptosporidium can be diagnosed by modified Ziehl-Neelsen staining of stool to reveal red cysts

Important for me Less important

Ziehl-Neelsen (acid-fast) staining on stool sample is commonly used to reveal characteristic red cysts of *Cryptosporidium*.

Blood culture and stool culture are important tests in patients presenting with severe gastroenteritis but in this instance, the question states that PHE wish to confirm cryptosporidiosis and therefore the diagnostic test is more appropriate.

Blood film might be considered if suspecting haemolytic-uraemic-syndrome secondary to *E. coli*.

Discuss

Improve

Next question >

Cryptosporidiosis

Cryptosporidiosis is the commonest protozoal cause of diarrhoea in the UK. Two species, *Cryptosporidium hominis* and *Cryptosporidium parvum* account for the majority cases.

Cryptosporidiosis is more common in immunocompromised patients (e.g. HIV) and young children.

Features

- watery diarrhoea
- abdominal cramps
- fever
- in immunocompromised patients the entire gastrointestinal tract may be affected resulting in complications such as sclerosing cholangitis and pancreatitis

Diagnosis

- stool: modified Ziehl-Neelsen stain (acid-fast stain) of the stool may reveal the characteristic red cysts of *Cryptosporidium*

Management

- is largely supportive
- nitazoxanide is licensed in the US for immunocompetent patients

A 45-year-old man presents to a sexual health clinic with a history of a solitary painful ulcer on the glans of his penis which came up 3 days previously. On examination, the ulcer is 2cm in diameter, irregular and there is unilateral tender inguinal lymphadenopathy. He has recently returned from a charity expedition to Africa. He is normally sexually active with his wife.

Which of the following bacteria should be screened for as part of his investigations?

☐ *Chlamydia trachomatis*

☐ *Staphylococcus aureus*

☐ *Haemophilus ducreyi*

☐ *Mycoplasma genitalium*

☐ *Streptococcus mitis*

Submit answer

<i>Chlamydia trachomatis</i>	22%
<i>Staphylococcus aureus</i>	8%
<i>Haemophilus ducreyi</i>	55%
<i>Mycoplasma genitalium</i>	9%
<i>Streptococcus mitis</i>	6%

Chancroid is an important differential diagnosis of genital ulcers if there is a history of foreign travel, particularly if associated with unilateral, painful inguinal lymph node enlargement

Important for me Less important

Chancroid should be considered given the physical signs listed and recent foreign travel. Sex worker use is another risk factor that may be pertinent.

The main differential diagnosis (syphilis) is not listed as an option.

Chlamydia trachomatis can cause lymphadenopathy and buboes in the context of lymphogranuloma venereum but this would more typically have associated rectal symptoms.

Mycoplasma genitalium is usually asymptomatic in men but where pathogenic tends to cause dysuria and testicular pain.

Streptococcus mitis is a commensal bacteria of the throat and *Staphylococcus aureus* a commensal of the skin.



 Discuss

Improve

Next question >

Chancroid

Chancroid is a tropical disease caused by *Haemophilus ducreyi*. It causes painful genital ulcers associated with unilateral, painful inguinal lymph node enlargement. The ulcers typically have a sharply defined, ragged, undermined border.

A 55-year-old, normally fit and well woman presents with a 1-week history of worsening dysarthria, diplopia, and dysphagia. Her husband has noticed her eyelids drooping and they have attended as she is now having difficulty lifting her head up. Her symptoms started 2 days after a takeaway meal deal for one and she had experienced some mild loose stools that evening.

On examination she has 2/5 power in her upper limbs, hypotonia with reduced reflexes, a dry mouth and dilated pupils. Sensory examination is normal.

What is the most likely bacterial pathogen?

☐ *Clostridium perfringens*

☐ *Clostridium tetani*

☐ *Clostridium botulinum*

☐ *Clostridium difficile*

☐ *Clostridium sordellii*

Submit answer

<i>Clostridium perfringens</i>	12%
<i>Clostridium tetani</i>	12%
<i>Clostridium botulinum</i>	58%
<i>Clostridium difficile</i>	10%
<i>Clostridium sordellii</i>	8%

Clostridium botulinum presents with flaccid paralysis, whereas *Clostridium tetani* presents with spastic paralysis

Important for me Less important

The presentation is one of flaccid paralysis, secondary to botulinum toxin which can be spread via food.

Clostridium tetani causes a spastic paralysis.

Clostridium perfringens commonly causes skin infections and gas gangrene.

Clostridium difficile does cause diarrheal illness but does not cause paralysis.

Clostridium sordellii is a very rare cause of post-partum and post-termination sepsis.




Discuss

Improve

Next question >

Clostridia

Clostridia are gram-positive, obligate anaerobic bacilli.

C. perfringens

- produces α -toxin, a lecithinase, which causes gas gangrene (myonecrosis) and haemolysis
- features include tender, oedematous skin with haemorrhagic blebs and bullae. Crepitus may present on palpation

C. botulinum

- typically seen in canned foods and honey
- prevents acetylcholine (ACh) release leading to flaccid paralysis

C. difficile

- causes pseudomembranous colitis, typically seen after the use of broad-spectrum antibiotics
- produces both an exotoxin and a cytotoxin

C. tetani

- produces an exotoxin (tetanospasmin) that prevents the release of glycine from Renshaw cells in the spinal cord causing a spastic paralysis

A 26-year-old man presents to his GP with a 1-week history of a 1cm black scab on his left calf and the subsequent development of a non-blanching raised rash over his torso and limbs. He tells you the rash initially started on his hands and feet and then spread. He also complains of a cough, mild headaches and malaise and has a fever on initial examination.

He has recently returned from backpacking around south-east Asia and Australia.

What is the most likely diagnosis?

- ☐ Scrub typhus
- ☐ Henoch-Schonlein purpura
- ☐ Meningococcal meningitis
- ☐ *Bacillus anthracis*
- ☐ Polyarteritis nodosa

Submit answer

Scrub typhus	31%
Henoch-Schonlein purpura	9%
Meningococcal meningitis	10%
<i>Bacillus anthracis</i>	43%
Polyarteritis nodosa	7%

In a patient with a black eschar and a vasculitis rash, typhus (caused by rickettsia) should be considered

Important for me [Less important](#)

The history of a black eschar and vasculitic rash should prompt consideration of scrub typhus which is caused by *Orientia tsutsugamushi* and is found in South East Asia and northern Australia.

Henoch Schonlein Purpura, polyarteritis nodosa and meningococcal meningitis would cause a vasculitic rash but are not associated with eschar.

Bacillus anthracis would account for the eschar but not typically a vasculitic rash.

Discuss

Improve

[Next question >](#)

Typhus

Overview

- rickettsial diseases
- transmitted between hosts by arthropods
- cause widespread vasculitis

Features

- fever, headache
- black eschar at site of original inoculation
- rash e.g. maculopapular or vasculitis
- complications: deranged clotting, renal failure, DIC

Rocky Mountain spotted fever

- caused by *R. rickettsii*
- initially macular rash on hands and feet then spreads

Tick typhus

- caused by *R. conorii*
- rash initially in axilla then spreads

A 19-year-old woman presents with a 1-week history of severe pharyngitis and progressive neck swelling and a 1-day history of chest pain and shortness of breath.

She is normally fit and well and has no recent history of foreign travel. She is unsure of the family history of cardiac disease as she was adopted as a toddler.

On examination, she has bilateral cervical lymphadenopathy and tonsillitis. She has a mild fever, heart rate 42 bpm. She has no clubbing or peripheral cyanosis. There are no audible murmurs.

ECG shows complete heart block with a ventricular escape rhythm at a rate of 40 bpm. CRP and troponin are elevated.

What is the most likely underlying pathogen?

- ☐ *Streptococcus viridans*
- ☐ *Streptococcus pyogenes*
- ☐ Coxsackie virus
- ☐ *Salmonella typhi*
- ☐ *Corynebacterium diphtheriae*

Submit answer

<i>Streptococcus viridans</i>	14%
<i>Streptococcus pyogenes</i>	17%
Coxsackie virus	27%
<i>Salmonella typhi</i>	11%
<i>Corynebacterium diphtheriae</i>	31%

One of the sequelae of diphtheria is cardiovascular disease; notably heart block

Important for me [Less important](#)

Diphtheria is a rare infection due to the routine vaccination of children in the UK. It presents with severe tonsillitis, neck swelling. Sequelae include myocarditis and rhythm abnormalities (in particular heart block); the latter is associated with poor prognosis.

Streptococcus viridans is a cause of infective endocarditis.

Streptococcus pyogenes is a group A beta haemolytic strep known to cause rheumatic fever.

Coxsackie virus and *Salmonella typhus* are known causes of myocarditis but would not classically cause severe tonsillitis.



 Discuss
  Improve

[Next question >](#)

Diphtheria

Diphtheria is caused by the Gram positive bacterium *Corynebacterium diphtheriae*

Pathophysiology

- releases an exotoxin encoded by a β -prophage
- exotoxin inhibits protein synthesis by catalyzing ADP-ribosylation of elongation factor EF-2

Diphtheria toxin commonly causes a 'diphtheric membrane' on tonsils caused by necrotic mucosal cells. Systemic distribution may produce necrosis of myocardial, neural and renal tissue

Possible presentations

- recent visitors to Eastern Europe/Russia/Asia
- sore throat with a 'diphtheric membrane' - see above
- bulky cervical lymphadenopathy
- neuritis e.g. cranial nerves
- heart block

An HIV positive patient presents for his regular clinic check-up having started antiretrovirals a few months previously. He is well and has an undetectable viral load on Truvada (emtricitabine/tenofovir) and raltegravir.

His blood tests are unremarkable apart from having a CD4 count of 184 cells/mm^3 .

Which drug should be added to his prescription for preventive purposes?

- ☐ Aciclovir
- ☐ Co-trimoxazole
- ☐ Prednisolone
- ☐ Rifampicin
- ☐ Nitrofurantoin

Submit answer

Aciclovir	13%
Co-trimoxazole	58%
Prednisolone	9%
Rifampicin	12%
Nitrofurantoin	8%

All patients with a CD4 count lower than 200/mm³ should receive prophylaxis against *Pneumocystis jiroveci* pneumonia

Important for me
 Less important

All patients with a CD4 count lower than 200 cells/mm³ should receive prophylaxis against *Pneumocystis jirovecii* pneumonia.

Aciclovir is sometimes used as longterm herpes suppression treatment in patients with both HIV and HSV.

The other answers are not routinely used as prophylaxis.

Discuss

Improve

Next question >

HIV: *Pneumocystis jiroveci* pneumonia

Whilst the organism *Pneumocystis carinii* is now referred to as *Pneumocystis jiroveci*, the term *Pneumocystis carinii* pneumonia (PCP) is still in common use

- Pneumocystis jiroveci* is an unicellular eukaryote, generally classified as a fungus but some authorities consider it a protozoa
- PCP is the most common opportunistic infection in AIDS
- all patients with a CD4 count < 200/mm³ should receive PCP prophylaxis

Features

- dyspnoea
- dry cough
- fever
- very few chest signs

Pneumothorax is a common complication of PCP.

Extrapulmonary manifestations are rare (1-2% of cases), may cause

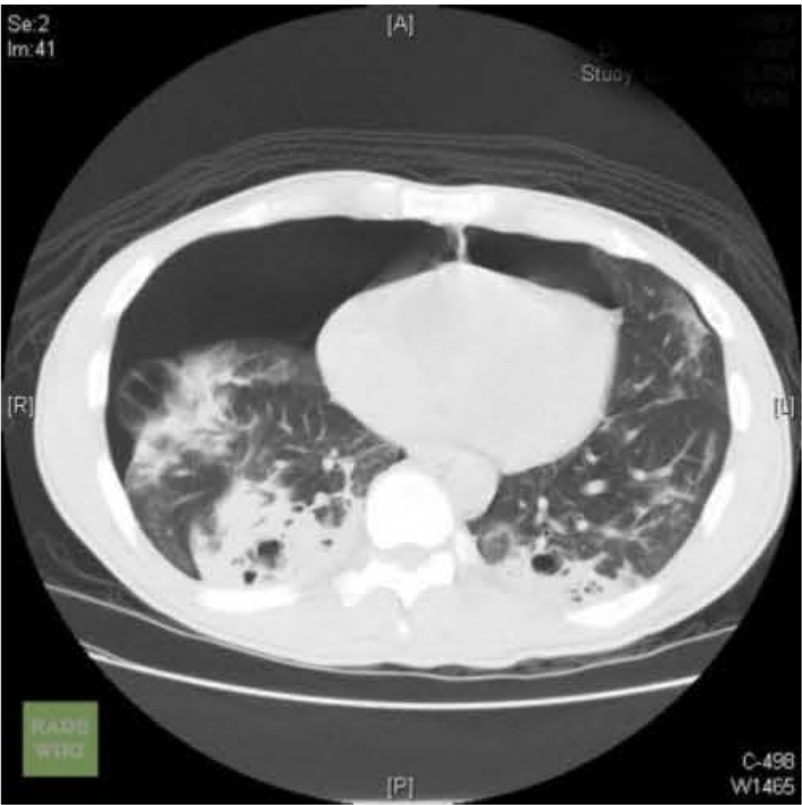
- hepatosplenomegaly
- lymphadenopathy
- choroid lesions

Investigation

- CXR: typically shows bilateral interstitial pulmonary infiltrates but can present with other x-ray findings e.g. lobar consolidation. May be normal
- exercise-induced desaturation
- sputum often fails to show PCP, bronchoalveolar lavage (BAL) often needed to demonstrate PCP (silver stain shows characteristic cysts)

Management

- co-trimoxazole
- IV pentamidine in severe cases
- steroids if hypoxic (if pO₂ < 9.3kPa then steroids reduce risk of respiratory failure by 50% and death by a third)



© Image used on license from Radiopaedia

CT scan showing a large pneumothorax developing in a patient with *Pneumocystis jiroveci* pneumonia

A 25-year-old man recently diagnosed with HIV presents to the emergency department with a 1-week history of severe malaise, fever, and haemoptysis with widespread lymphadenopathy. He had previously been well and had started anti-retroviral treatment 1 month previously having been diagnosed with HIV 12 weeks ago. His VIDAS test at diagnosis suggested he had fairly recently contracted the virus.

Blood tests from 1 week previous noted reduced viral load (200) and increased CD4 count (568 cells/mm³) than 2 months prior.

What is the most likely diagnosis?

- ☐ Cryptosporidiosis
- ☐ *Pneumocystis jirovecii*
- ☐ Hairy cell leukaemia
- ☐ Immune reconstitution inflammatory syndrome secondary to pulmonary tuberculosis
- ☐ Seroconversion

Submit answer

Cryptosporidiosis	10%
<i>Pneumocystis jirovecii</i>	13%
Hairy cell leukaemia	11%
Immune reconstitution inflammatory syndrome secondary to pulmonary tuberculosis	42%
Seroconversion	25%

Immune reconstitution inflammatory syndrome can occur in HIV positive patients when starting anti-retrovirals; this is an immune phenomenon that results in the clinical worsening of a pre-existing opportunistic infection

Important for me Less important

Immune reconstitution inflammatory syndrome can occur in HIV positive patients when starting antiretrovirals; this is an immune phenomenon that results in the clinical worsening of a pre-existing opportunistic infection.

IRIS can be difficult to diagnose and often microbiological tests are negative. IRIS may be the unmasking of a pre-existing infection but it may also represent newly acquired infection. IRIS can be life-threatening and require hospital admission.

Tuberculosis is the most common cause of IRIS.

IRIS can be distinguished from ARV failure by monitoring response to treatment- typically patients with IRIS will have low viral loads and higher CD4 counts whereas in treatment failure high viral load and low CD4 count would be typical.

Seroconversion is usually a mild flu-like illness prior to diagnosis. Hairy cell leukaemia would not normally present in this way.

Pneumocystis jirovecii pneumonia would present in a similar way but is unlikely given he has a CD4 count of > 200 cells/mm³.





 Discuss


 Improve

Immune reconstitution inflammatory syndrome

Immune reconstitution inflammatory syndrome is a condition generally associated with HIV/immunosuppression, in which the immune system begins to recover, but then responds to a previously acquired opportunistic infection with an overwhelming inflammatory response that paradoxically makes the symptoms of infection worse.

A 45-year-old woman is seen by her nephrologist following allogeneic renal transplant for end-stage renal failure. She continues to take prednisolone, azathioprine and ciclosporin. What complication is this patient most at risk of?

- ☐ Colorectal carcinoma
- ☐ Lung cancer
- ☐ Ovarian carcinoma
- ☐ Breast cancer
- ☐ Squamous cell carcinoma

Colorectal carcinoma

15%

Lung cancer

10%

Ovarian carcinoma

11%

Breast cancer

10%

Squamous cell carcinoma

54%

Patients who have received an organ transplant are at risk of skin cancer (particularly squamous cell carcinoma) due to long-term use of immunosuppressants

Important for me Less important

Patients on long-term immunosuppression for organ transplantation require regular monitoring as they are at increased risk of skin malignancy. Patients should be educated about minimising sun exposure to reduce the risk of squamous cell carcinomas and basal cell carcinomas.

Which one of the following is least associated with retroperitoneal fibrosis?

- ☐ Riedel's thyroiditis
- ☐ Previous radiotherapy
- ☐ Inflammatory abdominal aortic aneurysm
- ☐ Methysergide
- ☐ Sulphonamides

Riedel's thyroiditis

13%

Previous radiotherapy

6%

Inflammatory abdominal aortic aneurysm

17%

Methysergide

22%

Sulphonamides

42%

A 63-year-old with a background history of type 2 diabetes mellitus, hypertension, osteoarthritis and ischaemic heart disease is admitted to hospital with a right lower lobe pneumonia. On admission his urea and electrolytes are as follows:

Na ⁺	134 mmol/l
K ⁺	4.2 mmol/l
Urea	9.8 mmol/l
Creatinine	146 µmol/l

On review of his medical records, his bloods three months ago showed the following:

Na ⁺	135 mmol/l
K ⁺	4.1 mmol/l
Urea	4.3 mmol/l
Creatinine	88 µmol/l

Which of the following of his regular medications is it safe to continue?

- ☐ Metformin
- ☐ Low-dose aspirin
- ☐ Ramipril
- ☐ Ibuprofen
- ☐ Bendroflumethiazide

Metformin	9%
Low-dose aspirin	65%
Ramipril	12%
Ibuprofen	4%
Bendroflumethiazide	10%

NSAIDs should be stopped in AKI except aspirin at cardio-protective dose

Important for me Less important

All of these medications at full dose are either nephrotoxic or can become toxic when someone's renal function is reduced. Aspirin at cardio-protective doses (75 mg daily) however is not sufficient to cause a reduction in renal function and should be continued when someone has an acute kidney injury. All other NSAIDs and aspirin at full dose should be stopped to protect renal function as they can cause vasoconstriction resulting in a reduction in GFR.

ACE-inhibitors actively reduce the GFR by causing vasodilation of the efferent arteriole and reducing the glomerular filtration pressure. Because of this, they should always be stopped in acute kidney injuries as they can precipitate acute end-stage renal failure. This is in contrast to their role in the management of diabetic nephropathy where they have a reno-protective role by preventing further damage to the glomerulus. However, even in these cases, if the renal function deteriorates acutely the ACE inhibitor would be stopped (at least temporarily) to allow the kidneys to recover.

All diuretics have a nephrotoxic effect as they prevent fluid being reabsorbed into the capillaries from the tubules and hence the blood flow through the capillaries is lower. This results in a reduction in the delivery of oxygen to the distal ends of the system and can result in hypoxia and precipitate acute tubular necrosis. Although bendroflumethiazide is a relatively weak diuretic it should still be stopped until renal function has recovered.

Metformin does not cause damage to the kidneys but as it is renally cleared, it could build up due to renal failure. This would risk it causing a lactic acidosis, especially in the context of an infection.

A patient develops membranoproliferative glomerulonephritis secondary to partial lipodystrophy. Which type of complement is likely to be low?

☐ C3

☐ C4

☐ C2

☐ C9

☐ C6

C3

69%

C4

18%

C2

7%

C9

3%

C6

3%

Membranoproliferative glomerulonephritis (mesangiocapillary)

- type 1: cryoglobulinaemia, hepatitis C
- type 2: partial lipodystrophy

Important for me Less important

A 74-year-old man with stage IV chronic kidney disease secondary to type II diabetes mellitus is admitted to the acute medical assessment ward with symptoms of breathlessness and reduced exercise tolerance. He is otherwise systemically well. His blood results are as follows:

Haemoglobin	80 g/l
Mean Corpuscular Volume	90 fl
Mean Corpuscular Haemoglobin	30 pg
Urea	17 mmol/l
Creatinine	300 μ mol/l
eGFR	8 ml/min/1.73m ²

Given the likely cause of this patient's anaemia, which of the following compounds is the patient most likely to be deficient of?

- ☐ Vitamin B12
- ☐ Ferritin
- ☐ Folate
- ☐ Erythropoietin
- ☐ T3 / T4

Vitamin B12	4%
Ferritin	8%
Folate	4%
Erythropoietin	82%
T3 / T4	2%

Chronic Kidney Disease often leads to anaemia due to reduced levels of erythropoietin

Important for me [Less Important](#)

In many cases of advanced renal failure, the kidneys' ability to produce erythropoietin is reduced, leading to anaemia of chronic disease. There are several factors involved in renal anaemia, however a lack of erythropoietin is the most significant contributor.

Typically this deficiency manifests as a normochromic, normocytic anaemia, as seen in this patient's blood results.

In Vitamin B12/Folate deficiency and some cases of hypo/hyperthyroidism, a macrocytic anaemia is seen. Low ferritin levels will lead to a microcytic anaemia.

A 31-year-old man was found unconscious on the street and brought by ambulance to the emergency department. He has a background of epilepsy and intravenous drug abuse. On examination he is lethargic but no signs of focal neurology. Pupils normal size and both equally reactive to light. Blood pressure 138/82 mmHg, heart sounds normal. His left calf was mildly swollen and warm to touch. He was catheterized and a residual volume of 340 ml of dark urine was collected. Ultrasound of his renal tracts was normal.

Hb	136 g/l
Platelets	$136 \times 10^9/l$
WBC	$6.85 \times 10^9/l$

Na ⁺	134 mmol/l
K ⁺	3.9 mmol/l
Urea	9.1 mmol/l
Creatinine	235 μ mol/l
Urinary Na ⁺	58 mmol/l

Which of the following investigations is more useful to identify the cause of his acute kidney injury?

- ☐ Anticonvulsants serum levels
- ☐ Serum creatine kinase (CK)
- ☐ Liver function test and coagulation test
- ☐ Blood cultures and midstream specimen of urine
- ☐ CT-angiogram renal arteries and left lower limb

Anticonvulsants serum levels	6%
Serum creatine kinase (CK)	60%
Liver function test and coagulation test	5%
Blood cultures and midstream specimen of urine	6%
CT-angiogram renal arteries and left lower limb	22%

Rhabdomyolysis can cause parenchymal acute kidney injury and is characterised by elevated plasma creatine kinase (CK)

Important for me Less important

The most likely cause for the acute kidney injury in the scenario is the deposit of myoglobin. Creatine kinase is released into blood stream in case of a muscle injury, prevalent after seizures, crush syndromes, traumatic muscle injections, fall, drugs such as statins, malignant neuroleptic syndrome or rheumatological diseases such as dermatomyositis. It is a marker of possible acute kidney injury but what physically damage the glomerulus and kidney tubules is the deposit of myoglobin. It is characterised by dark urine and strong positivity for 'Blood' in urine dipstick, although it is not blood. This positivity is due to similar heme group that myoglobin and haemoglobin share.

Some deranged levels of anticonvulsants can indeed cause renal impaired but unlikely in this acute scenario.

Liver function test and coagulation could provide information liver failure and but not useful to identify the most likely cause of his acute kidney injury if there is no history of hepatitis or liver cirrhosis.

Blood cultures and midstream specimen of urine are unlikely to account for his raised creatinine unless in the presence of sepsis.

Finally, a CT-angiogram is useful if bilateral renal arteries stenosis is suspected, especially if the a patient's creatinine raises after being commenced on an angiotensin-converting-enzyme inhibitor.

A 65-year-old man is seen in the Emergency Department complaining of muscle weakness and lethargy. Admission bloods show the following:

Na ⁺	138 mmol/l
K ⁺	6.6 mmol/l
Bicarbonate	15 mmol/l
Urea	9.2 mmol/l
Creatinine	110 µmol/l

An ECG is done which shows no acute changes.

What is the most appropriate initial treatment to lower the serum potassium level?

- ☐ Intravenous bicarbonate
- ☐ Haemodialysis
- ☐ Insulin/dextrose infusion
- ☐ Intravenous calcium gluconate
- ☐ Oral calcium resonium

Intravenous bicarbonate

4%

Haemodialysis

3%

Insulin/dextrose infusion

60%

Intravenous calcium gluconate

29%

Oral calcium resonium

4%

Calcium gluconate would stabilise the myocardium but would not reduce the serum potassium level.

A 38-year-old woman presents for review of her hypertension. She was diagnosed 6 months ago, her blood pressure has been refractory to a combination of amlodipine and ramipril. On examination, heart rate is 80bpm and blood pressure is 170/100mmHg.

Investigations:

Serum potassium	2.9 mmol/L (3.5-5.0)
Plasma aldosterone (after 30 minutes supine)	600 pmol/L (135-400)
Plasma renin activity (after 30 minutes supine)	6.8 pmol/mL/hr (1.1-2.7)

What is the most likely cause of her hypertension?

- ☐ Bartter syndrome
- ☐ Bilateral renal artery stenosis
- ☐ Pheochromocytoma
- ☐ Pregnancy
- ☐ Primary hyperaldosteronism

Bartter syndrome	11%
Bilateral renal artery stenosis	39%
Phaeochromocytoma	7%
Pregnancy	2%
Primary hyperaldosteronism	42%

Primary hyperaldosteronism, bilateral renal artery stenosis and Bartter syndrome are associated with hypokalaemia due raised serum aldosterone.

Aldosterone is elevated in bilateral renal artery stenosis and Bartter syndrome due to reduced renal perfusion. Aldosterone is high in primary hyperaldosteronism due to (most commonly) an aldosterone producing adenoma.

However, serum renin is usually low in primary hyperaldosteronism due to the resulting hypertension causing excessive renal perfusion, which results in decreased renin production (negative feedback mechanism). High renin levels are seen in renal artery stenosis and Bartter syndrome as a mechanism to improve renal perfusion.

Renal artery stenosis is associated with hypertension and may be associated with abdominal bruits caused by turbulent flow within the stenosed arteries.

Bartter syndrome is associated with normotension.

The commonest cause of bilateral renal artery stenosis is atherosclerosis. However, in this scenario the patient is young and no cardiovascular risk factors are mentioned. Another cause of bilateral renal artery stenosis, which should be considered in this patient, is fibromuscular dysplasia, which can result in a non-atherosclerotic renal artery stenosis.

A 62-year-old man is admitted to resus with a low GCS. Blood gases taken on admission show the following:

pH	7.23
pCO ₂	2.2 kPa
pO ₂	13.8 kPa

IV access is obtained and bloods are taken. He is given supportive care with oxygen and fluids. Renal function results show:

Na ⁺	143 mmol/l
K ⁺	4.2 mmol/l
Chloride	109 mmol/l
Bicarbonate	12 mmol/l
Urea	2.1 mmol/l
Creatinine	79 µmol/l
Glucose	7.1 mmol/l

Which one of the following diagnoses would be most consistent with these results?

- ☐ Massive pulmonary embolism
- ☐ Methanol poisoning
- ☐ Paraquat poisoning
- ☐ Diabetic ketoacidosis
- ☐ Addisonian crisis

Massive pulmonary embolism

7%

Methanol poisoning

62%

Paraquat poisoning

8%

Diabetic ketoacidosis

17%

Addisonian crisis

6%

This patient has a raised anion gap metabolic acidosis which may be caused by methanol poisoning. Massive pulmonary embolism is unlikely given the pO_2 as is diabetic ketoacidosis given the blood glucose.

Dr. Assam

A 25-year-old woman with a history of end-stage renal disease secondary to focal segmental glomerulosclerosis presents to the Emergency Department. For the past 12 months she has used Continuous Ambulatory Peritoneal Dialysis (CAPD). She feels generally unwell with abdominal pain and a fever. She also describes her last bag as being 'cloudy'. Which organism is most likely to be responsible for this presentation?

- ☐ *Streptococcus pyogenes*
- ☐ *Enterococcus*
- ☐ *Staphylococcus epidermidis*
- ☐ *Streptococcus agalactiae*
- ☐ *Escherichia coli*

Streptococcus pyogenes

11%

Enterococcus

7%

Staphylococcus epidermidis

52%

Streptococcus agalactiae

7%

Escherichia coli

23%

Which of the following factors would suggest that a patient has pre-renal uraemia rather than established acute tubular necrosis?

- ☐ Urine sodium = 70 mmol/L
- ☐ Fractional urea excretion = 20%
- ☐ No response to fluid challenge
- ☐ Urine:plasma urea ratio 5:1
- ☐ Specific gravity = 1005

Urine sodium = 70 mmol/L

15%

Fractional urea excretion = 20%

46%

No response to fluid challenge

6%

Urine:plasma urea ratio 5:1

18%

Specific gravity = 1005

15%

ATN or prerenal uraemia? In prerenal uraemia think of the kidneys holding on to sodium to preserve volume

Important for me Less important

Which one of the following features is least likely to be seen in Henoch-Schonlein purpura?

- ☐ Abdominal pain
- ☐ Renal failure
- ☐ Polyarthrititis
- ☐ Thrombocytopenia
- ☐ Purpuric rash over buttocks

Abdominal pain

11%

Renal failure

19%

Polyarthrititis

23%

Thrombocytopenia

44%

Purpuric rash over buttocks

4%

A 45-year-old woman with nephrotic syndrome is noted to have marked loss of subcutaneous tissue from the face. What is the most likely underlying cause of her renal disease?

- ☐ Membranoproliferative glomerulonephritis type II
- ☐ Focal segmental glomerulosclerosis
- ☐ Minimal change glomerulonephritis
- ☐ Renal vein thrombosis
- ☐ Membranous glomerulonephritis

Membranoproliferative glomerulonephritis type II

59%

Focal segmental glomerulosclerosis

15%

Minimal change glomerulonephritis

5%

Renal vein thrombosis

3%

Membranous glomerulonephritis

18%

Membranoproliferative glomerulonephritis (mesangiocapillary)

- type 1: cryoglobulinaemia, hepatitis C
- type 2: partial lipodystrophy

Important for me Less important

This patient has partial lipodystrophy which is associated with membranoproliferative glomerulonephritis type II

You are asked to see a 69-year-old woman with a background history of Alzheimer's dementia and chronic kidney disease who was admitted to the ward with pneumonia and worsening confusion two days ago. The nurses report that her urine output has been falling steadily over the last 12 hours. She has been treated with intravenous co-amoxiclav and gentamicin and regularly takes paracetamol, amlodipine, furosemide and metoprolol. Her observations show a pulse rate of 91 bpm, a respiratory rate of 19 breaths per minute, oxygen saturations of 99% on air and a blood pressure of 143/81 mmHg.

Her bloods on admission show the following:

Hb	123 g/l	Na ⁺	139 mmol/l
Platelets	451 * 10 ⁹ /l	K ⁺	4.9 mmol/l
WBC	11.9 * 10 ⁹ /l	Urea	9.4 mmol/l
Neuts	9.7 * 10 ⁹ /l	Creatinine	163 µmol/l
Lymphs	1.4 * 10 ⁹ /l	CRP	179 mg/l

The last blood test from her GP showed the following urea and electrolytes:

Na ⁺	137 mmol/l
K ⁺	4.6 mmol/l
Urea	6.1 mmol/l
Creatinine	110 µmol/l

A urine dip is performed which shows the following:

Protein	++
Blood	Trace
Leucocytes	+++
Nitrites	Negative

Given the urine dip result, which of the following is the most likely cause of her acute kidney injury?

- ☐ Acute tubular necrosis due to rhabdomyolysis
- ☐ Acute interstitial nephritis due to co-amoxiclav
- ☐ Renal hypo-perfusion due to sepsis
- ☐ Bladder outlet obstruction due to infection
- ☐ Glomerulonephritis due to IgA nephropathy

Acute tubular necrosis due to rhabdomyolysis

7%

Acute interstitial nephritis due to co-amoxiclav

47%

Renal hypo-perfusion due to sepsis

30%

Bladder outlet obstruction due to infection

6%

Glomerulonephritis due to IgA nephropathy

10%

Urine dip can be used to differentiate acute tubular necrosis from acute interstitial nephritis in AKI

Important for me Less important

The key to answering this question is using the urine dip results. The presence of protein effectively rules out a pre-renal or post-renal cause and the lack of nitrites rules out infection. When trying to differentiate between the two intrinsic renal causes, it helps to understand how each of them affect the kidney. Acute interstitial nephritis is an inflammatory process so there is a higher white cell content in the urine, while acute tubular necrosis is not so the urine has no cellular component. A glomerulonephritis would induce a nephritic syndrome with blood present in the urine.

Given that in this case her urine contains a high white cell count and only a trace of blood, you can safely rule out a nephritic syndrome. In acute tubular necrosis you would not expect there to be far more leucocytes than red cells so this is also unlikely. The dip would however fit with a diagnosis of acute interstitial nephritis which is known to be caused by administration of penicillin-based antibiotics. Treatment would involve stopping the causative drug and supportive management with fluids.

Where is the site of action of spironolactone?

- ☐ Proximal convoluted tubule
- ☐ Ascending loop of Henle
- ☐ Descending loop of Henle
- ☐ Cortical collecting duct
- ☐ Macula densa

Proximal convoluted tubule

18%

Ascending loop of Henle

10%

Descending loop of Henle

8%

Cortical collecting duct

61%

Macula densa

4%

Spironolactone acts on the cortical collecting ducts as a diuretic

Important for me

Less important

A 39-year-old woman with systemic lupus erythematosus presents for review in the rheumatology clinic. On examination mild pedal oedema is noted and the blood pressure is slightly raised at 160/92 mmHg. Dipstick urine on arrival at clinic shows protein ++, blood +++. Further investigations reveal the following

Bicarbonate	22 mmol/l
Urea	7.1 mmol/l
Creatinine	134 μ mol/l
24-hour urinary protein	2.6 g

What is the renal biopsy most likely to show?

- ☐ Diffuse proliferative glomerulonephritis
- ☐ Mesangiocapillary glomerulonephritis
- ☐ Rapidly progressive glomerulonephritis
- ☐ Membranous glomerulonephritis
- ☐ Minimal change disease

Diffuse proliferative glomerulonephritis	69%
Mesangiocapillary glomerulonephritis	8%
Rapidly progressive glomerulonephritis	11%
Membranous glomerulonephritis	10%
Minimal change disease	2%

Diffuse proliferative glomerulonephritis is the most common and severe form of renal disease in SLE patients

Important for me [Less important](#)

Diffuse proliferative glomerulonephritis is the most common and severe form of renal disease in SLE patients. The following features are supportive of this diagnosis:

- haematuria
- proteinuria
- oedema
- hypertension

Autosomal dominant polycystic kidney disease type 1 is associated with a gene defect in:

- ☐ Chromosome 4
- ☐ Chromosome 8
- ☐ Chromosome 12
- ☐ Chromosome 16
- ☐ Chromosome 20

Chromosome 4

11%

Chromosome 8

7%

Chromosome 12

6%

Chromosome 16

73%

Chromosome 20

4%

ADPKD type 1 = chromosome 16 = 85% of cases

Important for me Less important

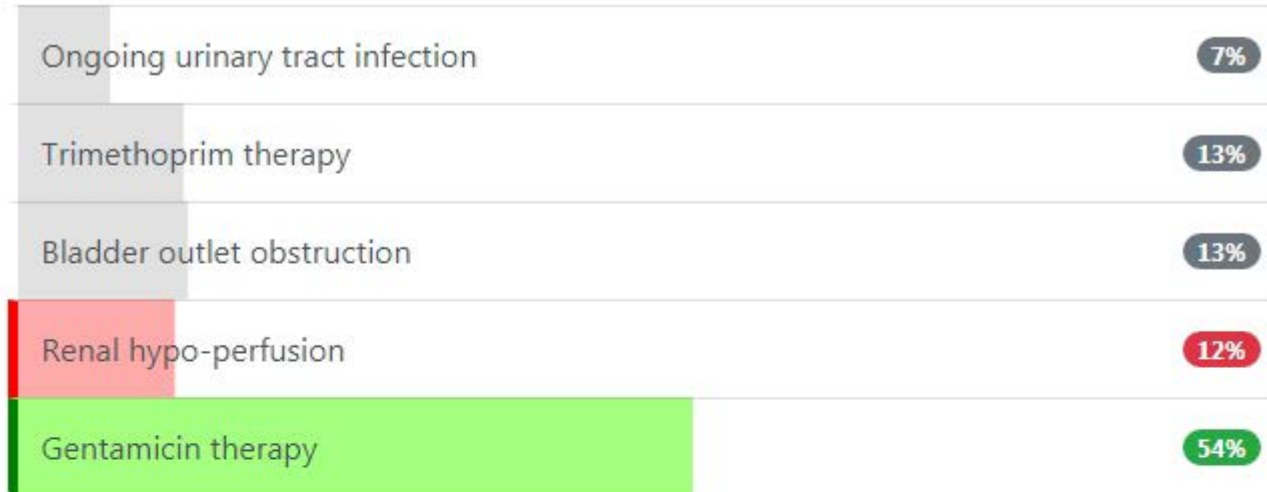
A 43-year-old man is admitted to hospital with pyelonephritis due to a ureteric stone. He is subsequently treated with intravenous antibiotics and endoscopic stone retrieval. He makes a good recovery clinically but after a few days his renal function begins to deteriorate and he develops an acute kidney injury. He is afebrile, his pulse rate is 67 bpm, blood pressure is 134/89 mmHg and he is catheterised and his urine output is approximately 60 ml per hour.

A urine dip is performed which shows the following:

Protein	++
Leucocytes	+
Nitrites	Negative
Blood	Trace

What is the most likely cause of his acute kidney injury?

- ☐ Ongoing urinary tract infection
- ☐ Trimethoprim therapy
- ☐ Bladder outlet obstruction
- ☐ Renal hypo-perfusion
- ☐ Gentamicin therapy



Gentamicin causes an intrinsic AKI

Important for me Less important

The urine dip shows proteinuria which would only be present with an intrinsic renal AKI. Given he has been treated for pyelonephritis, treatment with gentamicin would be the most likely cause of an intrinsic renal AKI in this gentleman.

His blood pressure and heart rate do not suggest he is under-perfusing his kidneys and bladder outlet obstruction is not possible if he has a urine output of 60 ml per hour. Ongoing infection is also unlikely given he is afebrile and nitrites are negative on the urine dip. Trimethoprim is not known to cause intrinsic renal damage.

A 60-year-old woman with a history of hypothyroidism and inflammatory arthritis is admitted after slipping on ice and falling over. Some routine blood tests are performed:

Na ⁺	141 mmol/l
K ⁺	2.9 mmol/l
Chloride	114 mmol/l
Bicarbonate	16 mmol/l
Urea	5.2 mmol/l
Creatinine	75 µmol/l

Which one of the following is most likely to explain these results?

- ☐ Renal tubular acidosis (type 1)
- ☐ Diabetic ketoacidosis
- ☐ Renal tubular acidosis (type 4)
- ☐ Aspirin overdose
- ☐ Conn's syndrome

Renal tubular acidosis (type 1)

37%

Diabetic ketoacidosis

13%

Renal tubular acidosis (type 4)

19%

Aspirin overdose

14%

Conn's syndrome

17%

Renal tubular acidosis causes a normal anion gap

Important for me Less important

The low bicarbonate suggests an acidosis. The anion gap is however normal, $(141 + 2.9) - (114 + 16) = 13.9$ mmol/l. The differential diagnosis is, therefore, causes of a metabolic acidosis with a normal anion gap.

Aspirin and diabetic ketoacidosis cause a metabolic acidosis associated with a raised anion gap. Conn's syndrome would explain the hypokalaemia but it does not cause a metabolic acidosis.

Renal tubular acidosis type 4 is associated with hyperkalaemia. The correct answer is, therefore, renal tubular acidosis type 1, which is likely to be secondary to this patient's inflammatory arthritis.

Which one of the following types of glomerulonephritis is most characteristically associated with Goodpasture's syndrome?

- ☐ Diffuse proliferative glomerulonephritis
- ☐ Mesangiocapillary glomerulonephritis
- ☐ Membranous glomerulonephritis
- ☐ Rapidly progressive glomerulonephritis
- ☐ Focal segmental glomerulosclerosis

Diffuse proliferative glomerulonephritis

8%

Mesangiocapillary glomerulonephritis

10%

Membranous glomerulonephritis

10%

Rapidly progressive glomerulonephritis

67%

Focal segmental glomerulosclerosis

5%

Rapidly progressive glomerulonephritis, causes:

- Goodpasture's
- ANCA positive vasculitis

Important for me Less important

Goodpasture's syndrome is rare condition associated with both pulmonary haemorrhage and rapidly progressive glomerulonephritis. It is caused by anti-glomerular basement membrane (anti-GBM) antibodies against type IV collagen

A 72-year-old woman who has been on the ward for the past five days is noted by the nurses not to be passing much urine. She was admitted originally with pneumonia but has since developed diarrhoea. Blood tests show her creatinine has increased from 98 to 172 $\mu\text{mol/l}$. Which one of the following tests is most useful when determining whether there is prerenal uraemia or acute tubular necrosis?

- ☐ Serum urea level
- ☐ Haemoglobin concentration
- ☐ Plasma osmolality
- ☐ Urinary urea
- ☐ Urinary sodium

Serum urea level

9%

Haemoglobin concentration

5%

Plasma osmolality

10%

Urinary urea

10%

Urinary sodium

66%

A 55-year-old presents to the Emergency Department with shortness-of-breath since the morning. Last month he was admitted following an inferior myocardial infarction. He was started on aspirin, atorvastatin, lisinopril and bisoprolol. An echocardiogram performed following the myocardial infarction showed normal left ventricular function. He is still a smoker despite repeated attempts to give up.

Examination today reveals bibasal crackles whilst the chest x-ray shows upper lobe diversion and perihilar shadowing. The ECG and cardiac enzymes are normal.

What is the most likely cause of his breathlessness?

- ☐ Infective endocarditis
- ☐ Pheochromocytoma
- ☐ Fibromuscular dysplasia
- ☐ Renal artery stenosis
- ☐ Anterior myocardial infarction

Infective endocarditis	4%
Phaeochromocytoma	3%
Fibromuscular dysplasia	19%
Renal artery stenosis	68%
Anterior myocardial infarction	6%

Flash pulmonary oedema, U&Es worse on ACE inhibitor, asymmetrical kidneys → renal artery stenosis - do MR angiography

Important for me Less important

Renal artery stenosis may cause sudden onset or 'flash' pulmonary oedema. A myocardial infarction is unlikely given the normal ECG and cardiac enzymes. Chest pain would also be expected in a 55-year-old patient with no history of diabetes. Fibromuscular dysplasia is generally seen in young woman.

A 33-year-old man presents with a one day history of pain and swelling in the right testicle. Around four weeks ago he returned from a holiday in Spain but reports no dysuria or urethral discharge. On examination he has a tender, swollen right testicle. On examination the heart rate is 84/min and his temperature is 37.1°C. What is the most appropriate management?

- ☐ IM ceftriaxone stat + oral doxycycline for 2 weeks
- ☐ Oral doxycycline + metronidazole for 2 weeks
- ☐ Oral trimethopim for 2 weeks
- ☐ Oral azithromycin stat dose
- ☐ Oral ciprofloxacin for 2 weeks

IM ceftriaxone stat + oral doxycycline for 2 weeks

52%

Oral doxycycline + metronidazole for 2 weeks

17%

Oral trimethopim for 2 weeks

4%

Oral azithromycin stat dose

12%

Oral ciprofloxacin for 2 weeks

16%

A 35-year-old woman presents with a one week history of progressive leg swelling. Her past medical history includes type 2 diabetes which is diet-controlled. On examination, there is bilateral pitting oedema up to her knees and periorbital oedema. Her observations are heart rate 88/min, blood pressure 151/91mmHg, oxygen saturations 97%, temperature 37.1°C, and respiratory rate 14/min. Urine dipstick shows protein +++. Two days later, she complains of left-sided flank pain and haematuria.

What complication has occurred?

- ☐ Haemorrhage into renal cyst
- ☐ Splenic infarction
- ☐ Renal vein thrombosis
- ☐ Haemolytic crisis
- ☐ Ureteric stone

Haemorrhage into renal cyst	9%
Splenic infarction	4%
Renal vein thrombosis	77%
Haemolytic crisis	4%
Ureteric stone	7%

Nephrotic syndrome is associated with a hypercoagulable state due to loss of antithrombin III via the kidneys

Important for me Less important

Nephrotic syndrome is associated with a hypercoagulable state due to loss of antithrombin III via the kidneys. The most common site of thrombosis is the renal vein but patients are also at risk of deep vein thromboses and pulmonary embolisms.

Haemorrhage into a renal cyst may present with flank pain and haematuria but this history is not suggestive of renal cystic disease.

Splenic infarction can occur in hypercoagulable states but this is less common than renal vein thrombosis in nephrotic syndrome. Furthermore, haematuria is not a feature of splenic infarction.

Haemolytic crisis occurs in sickle cell disease, not nephrotic syndrome.

Ureteric stones are not associated with nephrotic syndrome.

A sample of tissue from a renal biopsy is viewed using an electron microscope. Podocyte fusion is seen. Which one of the following types of glomerulonephritis is most associated with this finding?

- ☐ Membranous glomerulonephritis
- ☐ IgA nephropathy
- ☐ Focal segmental glomerulosclerosis
- ☐ Mesangiocapillary glomerulonephritis
- ☐ Minimal change glomerulonephritis

Membranous glomerulonephritis

11%

IgA nephropathy

5%

Focal segmental glomerulosclerosis

9%

Mesangiocapillary glomerulonephritis

7%

Minimal change glomerulonephritis

68%

Podocyte fusion is seen in minimal change glomerulonephritis but may occasionally be a feature of focal segmental glomerulosclerosis as well. Minimal change glomerulonephritis however is far more common

Which one of the following types of glomerulonephritis is most characteristically associated with partial lipodystrophy?

- ☐ Minimal change disease
- ☐ Diffuse proliferative glomerulonephritis
- ☐ Mesangiocapillary glomerulonephritis
- ☐ Membranous glomerulonephritis
- ☐ Rapidly progressive glomerulonephritis

Minimal change disease	6%
Diffuse proliferative glomerulonephritis	9%
Mesangiocapillary glomerulonephritis	63%
Membranous glomerulonephritis	15%
Rapidly progressive glomerulonephritis	6%

Mesangiocapillary glomerulonephritis (membranoproliferative)

- type 1: cryoglobulinaemia, hepatitis C
- type 2: partial lipodystrophy

Important for me Less important

Type 2 mesangiocapillary glomerulonephritis is associated with partial lipodystrophy.

Type 1 is seen in association with hepatitis C and cryoglobulinaemia

Mesangiocapillary glomerulonephritis is sometimes referred to as membranoproliferative glomerulonephritis

Which one of the following statements regarding the assessment of proteinuria in patients with chronic kidney disease is NOT true?

- ☐ Albumin:creatinine ratio (ACR) is more sensitive than protein:creatinine ratio (PCR)
- ☐ An ACR of 30 mg/mmol is approximately equal to a PCR of 50 mg/mmol
- ☐ An ACR sample is collected over 24 hours
- ☐ Women typically have higher ACR values
- ☐ An ACR of 3.8 mg/mmol in a diabetic man is clinically significant

Albumin:creatinine ratio (ACR) is more sensitive than protein:creatinine ratio (PCR) 9%

An ACR of 30 mg/mmol is approximately equal to a PCR of 50 mg/mmol 9%

An ACR sample is collected over 24 hours 56%

Women typically have higher ACR values 15%

An ACR of 3.8 mg/mmol in a diabetic man is clinically significant 11%

You are the ST2 working in the oncology out-patient clinic. Your next patient is a 67-year-old man with castrate resistant/ hormone resistant metastatic prostate cancer. Six months ago at his last clinic review he was commenced on a docetaxel-based chemotherapy regimen. Unfortunately, his disease has continued to progress. He is keen to pursue further treatment options and has been doing some research of his own on the internet and asks you about the possibility of starting treatment with abiraterone acetate. What is its mechanism of action?

- ☐ 5 alpha-reductase inhibitor
- ☐ Gonadotropin-releasing hormone (GnRH) agonist
- ☐ Disrupts microtubules thereby stopping cell division
- ☐ Cytochrome P450 17 alpha-hydroxylase inhibitor
- ☐ Alpha-blocker

5 alpha-reductase inhibitor

9%

Gonadotropin-releasing hormone (GnRH) agonist

29%

Disrupts microtubules thereby stopping cell division

21%

Cytochrome P450 17 alpha-hydroxylase inhibitor

37%

Alpha-blocker

5%

Abiraterone acetate is a selective androgen synthesis inhibitor that works by blocking cytochrome P450 17 alpha-hydroxylase. It blocks androgen production in the testes and adrenal glands, and in prostatic tumour tissue. Abiraterone is administered orally in combination with prednisolone. In a phase III clinical trial in men with castrate refractory prostate cancer who had yet to receive chemotherapy, the combination of abiraterone and prednisolone resulted in a significant survival benefit compared to placebo and prednisolone (progression free survival 16.5 months vs. 8.3 months). It is indicated for treating metastatic castration resistant (hormone-relapsed) prostate cancer in adult men who are asymptomatic or mildly symptomatic after failure of androgen deprivation therapy in whom chemotherapy is not yet clinically indicated. It is also indicated for treating metastatic castration resistant prostate cancer in men whose disease has progressed on or after a docetaxel-based chemotherapy regimen.

Which one of the following is not a risk factor for the development of calcium oxalate and calcium phosphate renal stones?

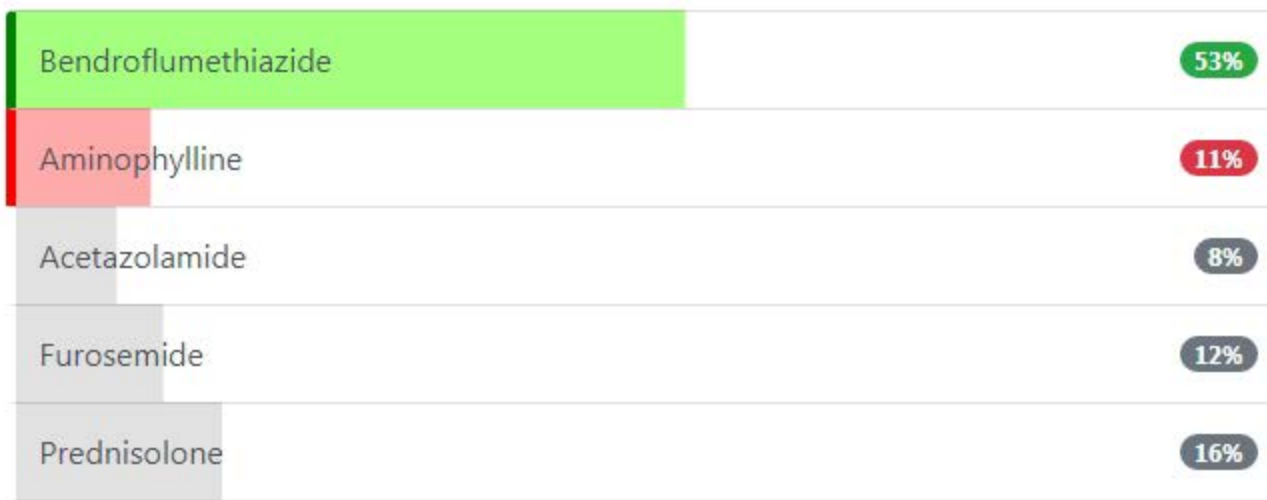
☐ Bendroflumethiazide

☐ Aminophylline

☐ Acetazolamide

☐ Furosemide

☐ Prednisolone



Bendroflumethiazide may help prevent the formation of calcium based renal stones. It may however theoretically increase the risk of urate based stones

A 67-year-old man presents with polyuria. His past medical history includes hypertension and bipolar disorder. His current medications include lisinopril, amlodipine, bendroflumethiazide, lithium and zopiclone. He smokes 20 cigarettes/day and drinks around 50 units of alcohol/week. He reports that his symptoms have been present for around two months and have been getting worse. Some basic fasting bloods are done:

Na ⁺	149 mmol/l
K ⁺	3.8 mmol/l
Urea	8.1 mmol/l
Creatinine	93 µmol/l
Glucose (fasting)	6.5 mol/l

What is the most likely underlying cause of his symptoms?

- ☐ Syndrome of inappropriate ADH secretion secondary to lung cancer
- ☐ Diabetes mellitus
- ☐ Side-effects of bendroflumethiazide
- ☐ Cranial diabetes insipidus secondary to lithium
- ☐ Nephrogenic diabetes insipidus secondary to lithium

Syndrome of inappropriate ADH secretion secondary to lung cancer

5%

Diabetes mellitus

4%

Side-effects of bendroflumethiazide

6%

Cranial diabetes insipidus secondary to lithium

9%

Nephrogenic diabetes insipidus secondary to lithium

76%

The fasting blood glucose is elevated and suggests a diagnosis of impaired fasting glycaemia, rather than diabetes mellitus. It certainly isn't high enough to be symptomatic.

A 45-year-old man with a history of alcoholic liver disease presents with abdominal distension. Examination reveals tense ascites which is drained. What is the appropriate type of diuretic to help prevent reaccumulation of ascites?

- ☐ Aldosterone antagonist
- ☐ Loop diuretic
- ☐ Thiazide diuretic
- ☐ Osmotic diuretic
- ☐ Carbonic anhydrase inhibitor

Aldosterone antagonist

67%

Loop diuretic

17%

Thiazide diuretic

6%

Osmotic diuretic

6%

Carbonic anhydrase inhibitor

4%

Ascites - use spironolactone

Important for me Less important

Aldosterone antagonists such as spironolactone are used in high doses to help prevent the formation of ascites in patients with chronic liver disease. A loop diuretic may need to be added in patients who don't respond

A 79-year-old complains of lower urinary tract symptoms. Which one of the following statements regarding benign prostatic hyperplasia is **incorrect**?

- ☐ Goserelin is licensed for refractory cases
- ☐ Side-effects of 5 alpha-reductase inhibitors include ejaculation disorders and gynaecomastia
- ☐ Possible presentations include recurrent urinary tract infection
- ☐ 5 alpha-reductase inhibitors typically decrease the prostate specific antigen level
- ☐ More common in black men

Goserelin is licensed for refractory cases

40%

Side-effects of 5 alpha-reductase inhibitors include ejaculation disorders and gynaecomastia

11%

Possible presentations include recurrent urinary tract infection

7%

5 alpha-reductase inhibitors typically decrease the prostate specific antigen level

24%

More common in black men

18%

Goserelin (Zoladex) is not used in the management of benign prostatic hyperplasia

A 50 year-old man with dialysis dependent chronic kidney disease is awaiting renal transplant. He complains of fatigue. On examination you note heart rate 95 beats per minute, soft ejection systolic murmur that doesn't radiate and pallor. There were no other abnormal features.

What is the most likely cause of his fatigue?

- ☐ Heart failure
- ☐ Endocarditis
- ☐ Uraemic encephalopathy
- ☐ Anaemia
- ☐ Hyperkalaemia



Condition	Percentage
Heart failure	6%
Endocarditis	7%
Uraemic encephalopathy	6%
Anaemia	78%
Hyperkalaemia	4%

Heart failure

6%

Endocarditis

7%

Uraemic encephalopathy

6%

Anaemia

78%

Hyperkalaemia

4%

Anaemia is extremely common in chronic kidney disease. It is often caused by iron deficiency or erythropoietin deficiency. The man in this case has a few signs and symptoms of anaemia - tachycardia, fatigue, pallor and an aortic flow murmur.

Dr Assem

You are asked to review a 75-year-old female on the surgical wards due to hyperkalaemia. Results are as follows:

	Plasma	Urine
Na ⁺ (mmol/l)	129	5
K ⁺ (mmol/l)	6.8	
Urea (mmol/l)	26	350
Creatinine (μmol/l)	262	
Osmolality (mosmol/kg)	296	470

What is the most likely diagnosis?

- ☐ Acute tubular necrosis
- ☐ Hyperosmolar non-ketotic coma
- ☐ Hydronephrosis
- ☐ Prerenal acute kidney injury
- ☐ Pyelonephritis

Acute tubular necrosis

31%

Hyperosmolar non-ketotic coma

6%

Hydronephrosis

4%

Prerenal acute kidney injury

56%

Pyelonephritis

3%

ATN or prerenal uraemia? In prerenal uraemia think of the kidneys holding on to sodium to preserve volume

Important for me Less important

The low urine sodium points towards prerenal acute kidney injury, as does the urine:plasma osmolality and urea ratio.

Dr Assem

Which one of the following statements is true regarding autosomal recessive polycystic kidney disease?

- ☐ Onset is typically in the third decade
- ☐ Liver involvement is rare
- ☐ Is due to a defect on chromosome 16
- ☐ More common than autosomal dominant polycystic kidney disease
- ☐ May be diagnosed on prenatal ultrasound

Onset is typically in the third decade

12%

Liver involvement is rare

12%

Is due to a defect on chromosome 16

19%

More common than autosomal dominant polycystic kidney disease

6%

May be diagnosed on prenatal ultrasound

51%

A 32-year-old male presents to his GP with swelling of his feet and hands and feeling lethargic. On examination, he has pitting oedema in both his upper and lower limbs and he appears to have peri-orbital oedema. His abdomen is distended and shifting dullness is present and there are coarse crackles audible on auscultation of both lung bases. A urine dip shows the following:

Leucocytes	negative
Nitrites	negative
Blood	negative
Protein	+++
pH	6
Glucose	negative

What is the most likely underlying pathology?

- ☐ Granulomatosis with polyangiitis
- ☐ Goodpasture's disease
- ☐ Focal segmental glomerulosclerosis
- ☐ Minimal change disease
- ☐ Mesangiocapillary glomerulonephritis

Granulomatosis with polyangiitis	7%
Goodpasture's disease	9%
Focal segmental glomerulosclerosis	29%
Minimal change disease	42%
Mesangiocapillary glomerulonephritis	14%

The lack of blood in the urine indicates this to be a purely nephrotic syndrome. Given the patient's age, the most likely cause of this would be a focal segmental glomerulosclerosis. Minimal change disease would have been the most likely differential of a nephrotic syndrome were the patient a child. Although membranous glomerulopathy can cause a nephrotic syndrome, it is not as common as either of the two other causes above.

Mesangiocapillary glomerulonephritis causes a nephritic syndrome with at least a small amount of blood being present in the urine, which is absent in this patient.

Granulomatosis with polyangiitis is associated with a more nephritic picture.

Goodpasture's is associated with haematuria and concurrent pulmonary disease in which haemoptysis is a feature, neither of which this patient has.

Which of the following types of renal stones are said to have a semi-opaque appearance on x-ray?

- ☐ Calcium oxalate
- ☐ Cystine stones
- ☐ Urate stones
- ☐ Xanthine stones
- ☐ Triple phosphate stones

Calcium oxalate

10%

Cystine stones

46%

Urate stones

17%

Xanthine stones

19%

Triple phosphate stones

8%

Renal stones on x-ray

- cystine stones: semi-opaque
- urate + xanthine stones: radio-lucent

Important for me Less important

A 26-year-old man with loin pain and haematuria is found to have autosomal dominant polycystic kidney disease. A defect in which one of the following genes is likely to be responsible?

- ☐ Fibrillin-2 gene
- ☐ Polycystin gene
- ☐ Fibrillin-1 gene
- ☐ Von Hippel-Lindau gene
- ☐ PKD1 gene



Most cases of autosomal dominant polycystic kidney disease (ADPKD) are due to a mutation in the PKD1 gene. The PKD1 gene encodes for a polycystin-1, a large cell-surface glycoprotein of unknown function

A 45-year-old woman with type 1 diabetes mellitus is reviewed in the diabetes clinic. Three months ago her blood tests were as followed:

K ⁺	4.5 mmol/l
Creatinine	116 µmol/l
eGFR	47 ml/min

At the time she was started on lisinopril to treat both the hypertension and act as a renoprotective agent. Lisinopril had been titrated up to treatment dose. Her current bloods are as follows:

K ⁺	4.9 mmol/l
Creatinine	123 µmol/l
eGFR	44 ml/min

Of the following options, what is the most appropriate course of action?

- ☐ Stop lisinopril and arrange investigations to exclude renal artery stenosis
- ☐ Switch to a angiotensin 2 receptor blocker
- ☐ Switch to a different ACE inhibitor
- ☐ No action
- ☐ Reduce dose of lisinopril

Stop lisinopril and arrange investigations to exclude renal artery stenosis

18%

Switch to a angiotensin 2 receptor blocker

6%

Switch to a different ACE inhibitor

3%

No action

67%

Reduce dose of lisinopril

6%

The small change in both the creatinine and eGFR are acceptable and below the threshold where ACE inhibitors should be stopped

Which one of the following types of glomerulonephritis is most characteristically associated with streptococcal infection in children?

- ☐ Focal segmental glomerulosclerosis
- ☐ Diffuse proliferative glomerulonephritis
- ☐ Membranous glomerulonephritis
- ☐ Mesangiocapillary glomerulonephritis
- ☐ Rapidly progressive glomerulonephritis

Focal segmental glomerulosclerosis

11%

Diffuse proliferative glomerulonephritis

34%

Membranous glomerulonephritis

18%

Mesangiocapillary glomerulonephritis

20%

Rapidly progressive glomerulonephritis

17%

Diffuse proliferative glomerulonephritis, causes:

- post-streptococcal
- SLE

Important for me Less important

Fanconi syndrome is associated with each one of the following, except:

- ☐ Hydronephrosis
- ☐ Osteomalacia
- ☐ Aminoaciduria
- ☐ Glycosuria
- ☐ Proximal renal tubular acidosis

Hydronephrosis

53%

Osteomalacia

11%

Aminoaciduria

11%

Glycosuria

13%

Proximal renal tubular acidosis

12%

A 29-year-old man has his renal function checked. The eGFR is calculated to be 54 ml/min. Which one of the following factors is most likely to explain this unexpectedly low result?

- ☐ Drinking a large amount of milk
- ☐ Being dehydrated when the blood sample was taken
- ☐ Being very tall
- ☐ Excessive alcohol intake
- ☐ Large muscle mass secondary to body building

Drinking a large amount of milk

3%

Being dehydrated when the blood sample was taken

19%

Being very tall

6%

Excessive alcohol intake

6%

Large muscle mass secondary to body building

67%

The eGFR is often inaccurate in people with extremes of muscle mass. Body builders often have an inappropriately low eGFR.

Which one of the following may be useful in the prevention of oxalate renal stones?

☐ Ferrous sulphate

☐ Thiazide diuretics

☐ Lithium

☐ Pyridoxine

☐ Allopurinol

Ferrous sulphate

3%

Thiazide diuretics

38%

Lithium

3%

Pyridoxine

46%

Allopurinol

10%

Dr. Asem

A 20-year-old woman presents with a 5-day history of painless light brown coloured urine. She has experienced 3 episodes of this over the 5 days. There is no dyspareunia, urgency or pain elsewhere. As of now, she is afebrile though she alludes to being ill with a respiratory infection around three weeks ago.

Urine dipstick revealed protein and blood.

What is the most likely diagnosis?

- ☐ Post streptococcus glomerulonephritis (PSGN)
- ☐ UTI
- ☐ Pyelonephritis
- ☐ Alport's syndrome
- ☐ IgA nephropathy

Post streptococcus glomerulonephritis (PSGN)

73%

UTI

2%

Pyelonephritis

3%

Alport's syndrome

5%

IgA nephropathy

17%

PSGN develops 1-2 weeks after URTI. IgA nephropathy develops 1-2 days after URTI

Important for me Less important

The symptoms, previous illness and proteinuria point to PSGN. This is a delayed antibody-mediated disease following infection of the pharynx or skin causing nephritic syndrome. Pyelonephritis and a UTI would present differently including symptoms such as fever, dysuria and pain. Alport's is characterised by haematuria, sensory hearing loss and ocular disturbances. IgA nephropathy would occur a few days after the respiratory infection rather than weeks.

Dr. Assam

A 44-year-old male with a background of multiple myeloma presents to the haematology clinic with swelling of the lower limbs. Blood tests showed low albumin levels and an urine dipstick was positive for protein. He has a kidney biopsy and stains positively for Congo-red which combined with polarised light, appears apple-green. What is the most likely diagnosis?

- ☐ Amyloidosis
- ☐ Minimal change disease
- ☐ IgA nephropathy
- ☐ Membranous glomerulonephritis
- ☐ Systemic lupus erythematosus

Amyloidosis	73%
Minimal change disease	6%
IgA nephropathy	7%
Membranous glomerulonephritis	11%
Systemic lupus erythematosus	4%

Patients with multiple myeloma are at risk to develop AL amyloidosis which can present as nephrotic syndrome like in this case. Such histopathological findings are only characteristic of amyloidosis and not the other 4 options.

Under electron microscopy, minimal change disease results in diffuse loss of visceral epithelial cells' foot processes, vacuolation and growth of microvilli on the visceral epithelial cells. Under light microscopy, very minimal changes are noted.

IgA nephropathy is characterised by deposits of immunoglobulin A in a granular pattern in the mesangium seen on immunofluorescence.

In membranous glomerulonephritis, the basement membrane is observed to be diffusely thickened. Using Jones' stain, the basement membrane appears to have a 'spiked' or 'holey' appearance.

Systemic lupus erythematosus can lead to membranous glomerulonephritis which is due to immune complex deposition along the glomerular basement membrane. This appears as a granular appearance on immunofluorescence testing.

A 62-year-old man attends your clinic. He has a history of hypertension and atrial fibrillation for which he is anticoagulated with warfarin. A urine dipstick taken 8 weeks ago during a routine hypertension clinic appointment showed blood + with leucocytes +. An initial urine microscopy and culture shows no growth. This result has been repeated on two further occasions with the same finding.

What is the most appropriate action?

- ☐ Take no further action
- ☐ Send a 24-urine sample for protein estimation
- ☐ Refer to nephrology
- ☐ Refer to urology
- ☐ Send a further urine microscopy

Post streptococcus glomerulonephritis (PSGN)

73%

UTI

2%

Pyelonephritis

3%

Alport's syndrome

5%

IgA nephropathy

17%

PSGN develops 1-2 weeks after URTI. IgA nephropathy develops 1-2 days after URTI

Important for me Less important

The symptoms, previous illness and proteinuria point to PSGN. This is a delayed antibody-mediated disease following infection of the pharynx or skin causing nephritic syndrome. Pyelonephritis and a UTI would present differently including symptoms such as fever, dysuria and pain. Alport's is characterised by haematuria, sensory hearing loss and ocular disturbances. IgA nephropathy would occur a few days after the respiratory infection rather than weeks.

You are working on a general medical ward and are reviewing the blood results and observations charts of your patients. Which of the below patients meets the criteria for an acute kidney injury?

- ☐ Patient with a potassium of 6.7 mmol/L
- ☐ Patient whose creatinine has increased from 78 to 100 micromol/L over 48 hours
- ☐ Patient with a creatinine of 150 micromol/L, whose most recent creatinine 12 months ago was 110 micromol/L
- ☐ 70kg patient who has produced 20-25ml of urine per hour for each of the last 7 hours
- ☐ Patient with an eGFR of 60

Patient with a potassium of 6.7 mmol/L

10%

Patient whose creatinine has increased from 78 to 100 micromol/L over 48 hours

22%

Patient with a creatinine of 150 micromol/L, whose most recent creatinine 12 months ago was 110 micromol/L

9%

70kg patient who has produced 20-25ml of urine per hour for each of the last 7 hours

54%

Patient with an eGFR of 60

5%

Urine output of < 0.5 ml/kg/hr over 6 consecutive hours constitutes an acute kidney injury

Important for me Less important

The correct answer is the patient who has produced 20-25ml of urine per hour over the last seven consecutive hours. He should be producing more than 35ml per hour for his weight.

The patient with a potassium of 6.7 may have hyperkalaemia from multiple causes other than acute kidney injury. The second patient has a creatinine rise of 22 micromol/L in 48 hours, which does not meet the acute kidney injury definition of a rise of > 26 in 48 hours. The third patient has a $< 50\%$ increase in creatinine and this may not have occurred within the last 7 days as his most recent reading was 12 months ago. The patient with a single eGFR reading of 60 may have an AKI or chronic kidney disease but more readings are required to assess the trend.

NICE CKS. Acute kidney injury

Dr Assem

An 8-year-old boy presents to his GP with swelling around his eyes and limbs, tiredness and weight gain. The GP performs a urine dip. What is the most likely underlying pathology in this child?

- ☐ IgA nephropathy
- ☐ Minimal change disease
- ☐ Glomerulosclerosis
- ☐ Type I diabetes mellitus
- ☐ Membranous glomerulonephritis

IgA nephropathy	10%
Minimal change disease	80%
Glomerulosclerosis	2%
Type I diabetes mellitus	3%
Membranous glomerulonephritis	5%

Minimal change disease is the most common cause of nephrotic syndrome in a child

Important for me Less important

The correct answer is 2. This child is presenting with nephrotic syndrome. The classic triad of nephrotic syndrome is proteinuria, hypoalbuminaemia and oedema. The most common cause of nephrotic syndrome in children is minimal change disease, which accounts for around 80% of cases in children. Minimal change disease accounts for only 10-25% of cases of nephrotic syndrome in adults.

KDIGO clinical practice guideline for glomerulonephritis

<http://kdigo.org/clinicalpracticeguidelines/pdf/KDIGO-GN-Guideline.pdf>

A 28-year-old female undergoes a renal transplant for focal segmental glomerulosclerosis. Within hours of the operation the patient becomes unwell with features consistent with severe systemic inflammatory response syndrome. The patient is immediately taken back to theatre and the transplanted kidney is removed. What type of immunoglobulins are responsible for the graft rejection?

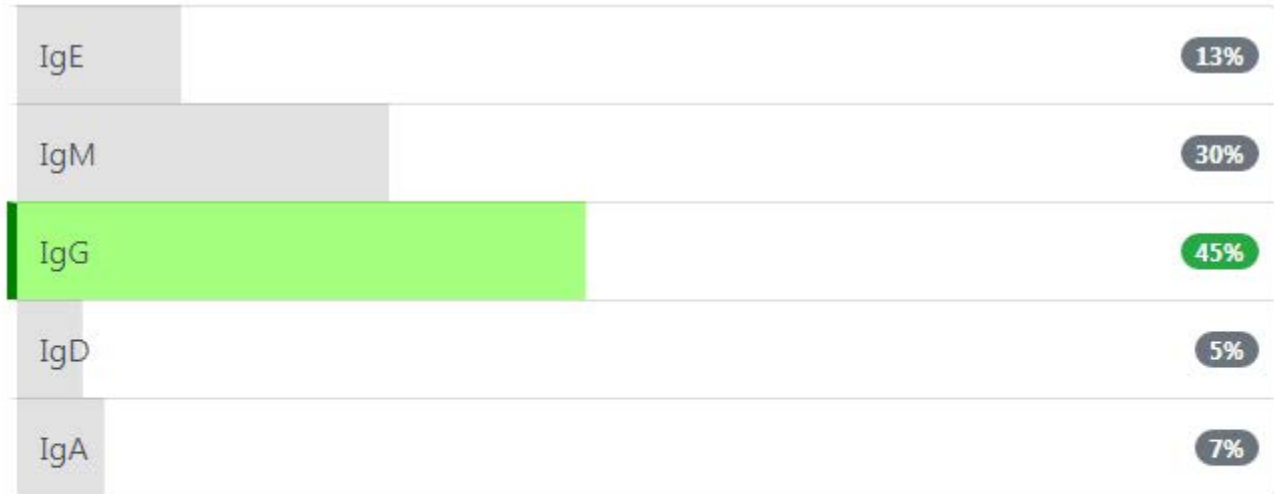
☐ IgE

☐ IgM

☐ IgG

☐ IgD

☐ IgA



Hyperacute graft rejection is due to pre-existent antibodies to HLA antigens and is therefore IgG mediated

A 25-year-old man presents with haematuria, fever, vomiting and fatigue. He has a creatinine of 342, having previously had a creatinine of 95 when it was last checked 2 years ago. In the emergency department, he coughs up a small amount of bloody sputum and then has a nosebleed. He also complains of an earache. From this information, which of the following conditions is most likely?

- ☐ Pneumonia
- ☐ Granulomatosis with polyangiitis
- ☐ Systemic lupus erythematosus
- ☐ Goodpasture's syndrome
- ☐ Churg-Strauss syndrome

Pneumonia	2%
Granulomatosis with polyangiitis	50%
Systemic lupus erythematosus	3%
Goodpasture's syndrome	33%
Churg-Strauss syndrome	12%

The presence of upper respiratory tract signs points towards granulomatosis with polyangiitis in a patient with rapidly progressive glomerulonephritis

Important for me Less important

The correct answer is 2. This patient has an acute kidney injury, fever, and upper respiratory tract signs. The presence of upper respiratory tract or ENT signs points towards granulomatosis with polyangiitis (GPA, previously called Wegener's syndrome). A patient with Goodpasture's syndrome is likely to present with haemoptysis but would not be expected to have ENT signs such as epistaxis or an earache. Other ENT signs in GPA include crusting around the nostrils, sinusitis or sinus pain, hearing loss, or a blocked or a runny nose.

<https://www.nhs.uk/conditions/granulomatosis-with-polyangiitis/>

A 62-year-old man is diagnosed with renal cell cancer. Which one of the following hormones is least likely to be present in excessive levels?

- ☐ Erythropoietin
- ☐ Parathyroid hormone
- ☐ Growth hormone
- ☐ ACTH
- ☐ Renin

Erythropoietin

28%

Parathyroid hormone

11%

Growth hormone

40%

ACTH

9%

Renin

12%

A 10-year-old boy is taken to see the GP by his mother. For the past two days he has had a sore throat associated with blood in his urine. There is no significant past medical history. The GP suspects glomerulonephritis and refers the patient to hospital. What would a renal biopsy most likely show?

☐ Proliferation of endothelial cells

☐ No change

☐ Mesangial hypercellularity

☐ Basement membrane thickening

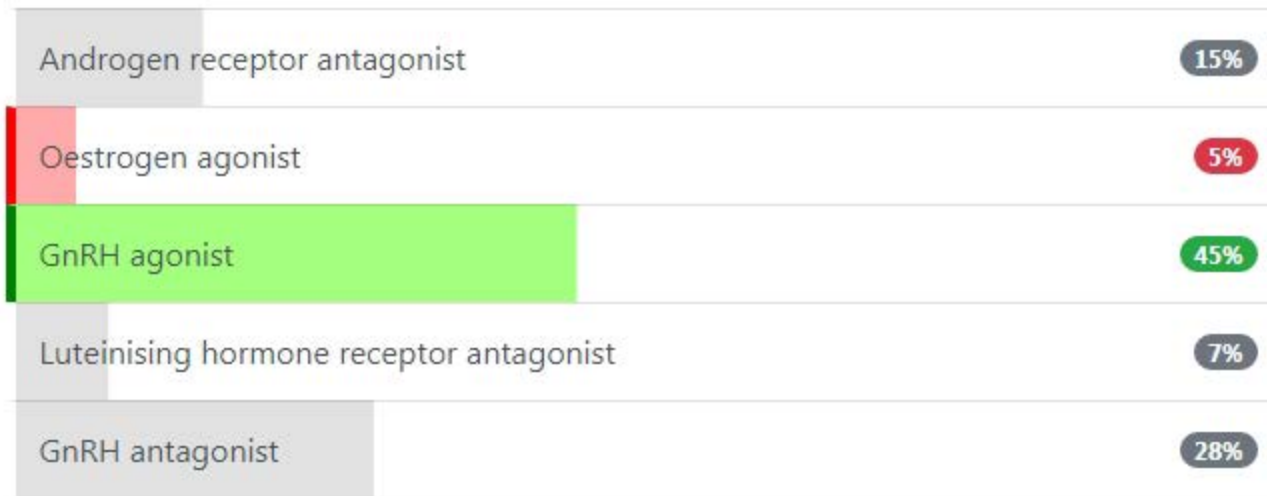
☐ Capillary wall necrosis

Proliferation of endothelial cells	11%
No change	11%
Mesangial hypercellularity	56%
Basement membrane thickening	18%
Capillary wall necrosis	3%

This boy is likely to have IgA nephropathy. Histological features include mesangial hypercellularity and positive immunofluorescence for IgA & C3

What is the mechanism of action of goserelin in prostate cancer?

- ☐ Androgen receptor antagonist
- ☐ Oestrogen agonist
- ☐ GnRH agonist
- ☐ Luteinising hormone receptor antagonist
- ☐ GnRH antagonist



Goserelin (Zoladex) is a synthetic GnRH agonist which provides negative feedback to the anterior pituitary

Each one of the following is a recognised side-effect of erythropoietin, except:

- ☐ Urticaria
- ☐ Hypertension
- ☐ Bone aches
- ☐ Long bone fractures
- ☐ Pure red cell aplasia

Urticaria

11%

Hypertension

12%

Bone aches

7%

Long bone fractures

50%

Pure red cell aplasia

21%

A 13-year-old girl develops purpura on her lower limbs and buttocks associated with microscopic haematuria. A diagnosis of Henoch-Schonlein purpura is made. Her urea and electrolytes show mild renal impairment that is still present 4 weeks later, although she does not require any specific therapy. What is the most likely renal outcome?

☐ Hypertension within 20 years

☐ Persistent proteinuria

☐ End stage renal failure

☐ Full renal recovery

☐ Frequent relapses

A 13-year-old girl develops purpura on her lower limbs and buttocks associated with microscopic haematuria. A diagnosis of Henoch-Schonlein purpura is made. Her urea and electrolytes show mild renal impairment that is still present 4 weeks later, although she does not require any specific therapy. What is the most likely renal outcome?



A 55-year-old male is being evaluated for persistent proteinuria. He has a past medical history of multiple myeloma that has recently relapsed. He undergoes renal biopsy. Light microscopy with Congo red stain reveals apple-green birefringence under polarised light.

What is the most likely diagnosis?

- ☐ Alport syndrome
- ☐ Focal segmental glomerulosclerosis
- ☐ Goodpasture syndrome
- ☐ Acute post-streptococcal glomerulonephritis
- ☐ Amyloidosis

Alport syndrome	3%
Focal segmental glomerulosclerosis	6%
Goodpasture syndrome	4%
Acute post-streptococcal glomerulonephritis	2%
Amyloidosis	86%

Amyloidosis biopsy findings - Congo red stain shows apple-green birefringence under polarised light

Important for me Less important

Primary amyloidosis can be seen in patients with immune dyscrasias such as multiple myeloma. Amyloidosis is a term which describes the extracellular deposition of an insoluble fibrillar protein termed amyloid. It can affect any organ in the body. The diagnosis of amyloidosis is confirmed via a biopsy with Congo red staining showing apple-green birefringence under polarised light.

Alport syndrome (mutation in type IV collagen) would result in a 'basket weave' appearance on electron microscopy. It causes eye problems, glomerulonephritis and sensorineural deafness.

Focal segmental glomerulosclerosis would show segmental sclerosis and hyalinosis on light microscopy and effacement of foot process on electron microscopy (similar to minimal change disease).

Goodpasture syndrome would result in crescentic glomerulonephritis. Glomeruli appear like a crescent moon on light microscopy and immunofluorescence.

Acute post-streptococcal glomerulonephritis would show enlarged and hypercellular glomeruli with 'starry sky' (granular) appearance on light microscopy and immunofluorescence, respectively. There are subepithelial immune complex humps on electron microscopy.

You are a medical senior house officer starting a Saturday shift covering the renal ward. The night shift doctor is handing over the unwell patients to you. Which of the patients below with acute kidney injury should be referred today for urgent renal replacement therapy?

- ☐ Patient with potassium of 6.8 who has had 3 courses of medical management of hyperkalaemia but with no reduction in his potassium level
- ☐ Patient with eGFR < 5
- ☐ Patient who has had 10ml of urine output over the last 24 hours
- ☐ Patient with stage III acute kidney injury and only one kidney
- ☐ Patient who has previously had acute kidney injury three times before

Patient with potassium of 6.8 who has had 3 courses of medical management of hyperkalaemia but with no reduction in his potassium level

66%

Patient with eGFR < 5

8%

Patient who has had 10ml of urine output over the last 24 hours

13%

Patient with stage III acute kidney injury and only one kidney

10%

Patient who has previously had acute kidney injury three times before

3%

In AKI, hyperkalaemia which is refractory to medical management is an indicator for renal replacement therapy

Important for me Less important

NICE states that the below criteria are all indications for renal replacement therapy in acute kidney injury - but all only if refractory to medical management:

1. Hyperkalaemia
2. Metabolic acidosis
3. Symptoms or complications of uraemia e.g. pericarditis or encephalopathy
4. Severe pulmonary oedema

NICE: Acute kidney injury; prevention, detection and management

<https://www.nice.org.uk/guidance/cg169/chapter/1-Recommendations#managing-acute-kidney-injury>

Which one of the following diseases would give a positive cyanide-nitroprusside test?

- ☐ Bartter's syndrome
- ☐ Cryoglobulinaemia
- ☐ Cystinuria
- ☐ Paroxysmal nocturnal haemoglobinuria
- ☐ Cystinosis

Bartter's syndrome

5%

Cryoglobulinaemia

11%

Cystinuria

52%

Paroxysmal nocturnal haemoglobinuria

16%

Cystinosis

15%

The cyanide-nitroprusside test would also be positive in homocystinuria

Each of the following is a risk factor for renal stone formation, except:

- ☐ Renal tubular acidosis
- ☐ Cadmium
- ☐ Hyperparathyroidism
- ☐ Dehydration
- ☐ Cystinosis

Renal tubular acidosis

15%

Cadmium

35%

Hyperparathyroidism

7%

Dehydration

6%

Cystinosis

37%

Cystinuria, not cystinosis, is a risk factor for renal stone formation

Dr Assem

A 65-year-old man with a history of hypertension is reviewed. As part of routine blood tests to monitor his renal function whilst taking ramipril the following blood tests are received:

Na ⁺	140 mmol/l
K ⁺	4.8 mmol/l
Urea	6.2 mmol/l
Creatinine	102 µmol/l
eGFR	68 ml/min

A urine dipstick is subsequently performed which is normal and a renal ultrasound sound shows normal sized kidneys with no abnormality detected. What stage of chronic kidney disease does this patient have?

- ☐ No chronic kidney disease
- ☐ Chronic kidney disease stage 4
- ☐ Chronic kidney disease stage 3
- ☐ Chronic kidney disease stage 2
- ☐ Chronic kidney disease stage 1

No chronic kidney disease

47%

Chronic kidney disease stage 4

4%

Chronic kidney disease stage 3

5%

Chronic kidney disease stage 2

27%

Chronic kidney disease stage 1

17%

CKD: only diagnose stages 1 & 2 if supporting evidence to accompany eGFR

Important for me Less important

Chronic kidney disease is only diagnosed in this situation if supporting tests such as urinalysis or renal ultrasound are abnormal

Dr Assem

A mutation in the gene that encodes aquaporin 2 is most likely to result in:

- ☐ Histiocytosis
- ☐ Alport's syndrome
- ☐ Minimal change disease
- ☐ Diabetes insipidus
- ☐ Medullary sponge kidney

Histiocytosis

6%

Alport's syndrome

15%

Minimal change disease

5%

Diabetes insipidus

67%

Medullary sponge kidney

8%

A 54-year-old woman is admitted to the Emergency Department following what sounds like an episode of vasovagal syncope. Blood gases on admission show a metabolic acidosis. Blood tests are reported as follows:

Na ⁺	143 mmol/l
K ⁺	3.0 mmol/l
Chloride	116 mmol/l
Bicarbonate	18 mmol/l
Urea	4.0 mmol/l
Creatinine	88 µmol/l

Which one of the following is most likely to explain the metabolic acidosis?

- ☐ Lithium overdose
- ☐ Aspirin overdose
- ☐ Recent myocardial infarction
- ☐ Alcoholic ketoacidosis
- ☐ Ureterosigmoidostomy

Lithium overdose	12%
Aspirin overdose	19%
Recent myocardial infarction	8%
Alcoholic ketoacidosis	15%
Ureterosigmoidostomy	45%

Ureterosigmoidostomy - normal anion gap metabolic acidosis

Important for me Less important

The anion gap is normal, $(143 + 3.0) - (116 + 18) = 12$ mmol/l, which is consistent with a ureterosigmoidostomy. Aspirin overdose, myocardial infarction and alcoholic ketoacidosis would cause a raised anion gap

You are reviewing a 65-year-old in the renal clinic. He has been on haemodialysis for chronic kidney disease for the past 6 years. What is he most likely to die from?

- ☐ Hyperkalaemia
- ☐ Malignancy
- ☐ Dilated cardiomyopathy
- ☐ Dialysis related sepsis
- ☐ Ischaemic heart disease

Hyperkalaemia

10%

Malignancy

3%

Dilated cardiomyopathy

13%

Dialysis related sepsis

13%

Ischaemic heart disease

62%

CKD on haemodialysis - most likely cause of death is IHD

Important for me

Less important

Cardiovascular events account for 50% of the mortality in patients receiving dialysis.

Which one of the following statements regarding minimal change glomerulonephritis is **incorrect**?

- ☐ Has a good prognosis
- ☐ The majority of cases are steroid responsive
- ☐ Is a common cause of nephrotic syndrome
- ☐ Hypertension is found in approximately 25% of patients
- ☐ Haematuria is rare

Has a good prognosis

5%

The majority of cases are steroid responsive

8%

Is a common cause of nephrotic syndrome

11%

Hypertension is found in approximately 25% of patients

60%

Haematuria is rare

16%

Hypertension and haematuria are rare in minimal change glomerulonephritis

A 47-year-old woman presents with loin pain and haematuria. Urine dipstick demonstrates:

Blood	++++
Nitrites	POS
Leucocytes	+++
Protein	++

Urine culture shows a *Proteus* infection. An x-ray demonstrates a stag-horn calculus in the left renal pelvis. What is the most likely composition of the renal stone?

- ☐ Xanthine
- ☐ Calcium oxalate
- ☐ Struvite
- ☐ Cystine
- ☐ Urate

Xanthine

3%

Calcium oxalate

4%

Struvite

88%

Cystine

3%

Urate

2%

Stag-horn calculi are composed of struvite and form in alkaline urine (ammonia producing bacteria therefore predispose)

Important for me Less important

A 62-year-old man presents with nocturia, hesitancy and terminal dribbling. Prostate examination reveals a moderately enlarged prostate with no irregular features and a well defined median sulcus. Blood tests show:

PSA	1.3 ng/ml
-----	-----------

What is the most appropriate management?

- ☐ Alpha-1 antagonist
- ☐ 5 alpha-reductase inhibitor
- ☐ Non-urgent referral for transurethral resection of prostate
- ☐ Empirical treatment with ciprofloxacin for 2 weeks
- ☐ Urgent referral to urology

Alpha-1 antagonist

58%

5 alpha-reductase inhibitor

25%

Non-urgent referral for transurethral resection of prostate

6%

Empirical treatment with ciprofloxacin for 2 weeks

5%

Urgent referral to urology

6%

Alpha-1 antagonists are first-line in patients with benign prostatic hyperplasia

Dr Assem

Alport's syndrome is due to a defect in:

- ☐ Fibrillin-2
- ☐ Type II collagen
- ☐ Fibrillin-1
- ☐ Type IV collagen
- ☐ Type V collagen

Fibrillin-2

8%

Type II collagen

11%

Fibrillin-1

8%

Type IV collagen

67%

Type V collagen

7%

Alport's syndrome - type IV collagen defect

Important for me

Less important

A 54-year-old man who has end stage diabetic nephropathy is being assessed for a renal transplant. When assessing the HLA matching between donor and recipient what is the most important HLA antigen to match?

☐ DP

☐ B

☐ DR

☐ C

☐ A



Renal transplant HLA matching - DR is the most important

Important for me Less important

You review a 42-year-old woman six weeks following a renal transplant for focal segmental glomerulosclerosis. Following the procedure she was discharged on a combination of tacrolimus, mycophenolate, and prednisolone. She has now presented with a five day history of feeling generally unwell with anorexia, fatigue and arthralgia. On examination her sclera are jaundiced and she has widespread lymphadenopathy with hepatomegaly. What is the most likely diagnosis?

- ☐ Hepatitis C
- ☐ Epstein-Barr virus
- ☐ HIV
- ☐ Hepatitis B
- ☐ Cytomegalovirus



Cytomegalovirus is the most common and important viral infection in solid organ transplant recipients

Important for me Less important

Ganciclovir is the treatment of choice in such patients.

What is the most likely outcome following the diagnosis of minimal change nephropathy in a 10-year-old male?

- Chronic kidney disease requiring renal replacement therapy within 30 years
- Full recovery and no further episodes
- Full recovery but with later relapses
- Chronic kidney disease not requiring renal replacement therapy
- Chronic kidney disease requiring renal replacement therapy within 10 years

Chronic kidney disease requiring renal replacement therapy within 30 years	2%
Full recovery and no further episodes	54%
Full recovery but with later relapses	40%
Chronic kidney disease not requiring renal replacement therapy	2%
Chronic kidney disease requiring renal replacement therapy within 10 years	2%

As 1/3 of patients have infrequent relapses and 1/3 of patients have frequent relapses a majority (2/3) will have later recurrent episodes. It is important however to stress to patients that generally speaking the longer term prognosis in minimal change glomerulonephritis is good.

A 73-year-old with a history of alcohol excess is admitted following a fall at home. On admission the following blood results are obtained:

Urea	3.5 mmol/l
Creatinine	110 μ mol/l
Creatine kinase	180 u/l

Three days later the blood results are as follows:

Urea	14.5 mmol/l
Creatinine	248 μ mol/l
Creatine kinase	4,400 u/l

Which one of the following would have been most likely to prevent the deterioration in renal function?

- ☐ Low dose dopamine
- ☐ Urinary acidification
- ☐ Intravenous fluids
- ☐ Frusemide
- ☐ Mannitol

Low dose dopamine

3%

Urinary acidification

5%

Intravenous fluids

82%

Furosemide

5%

Mannitol

5%

Collapse + ARF → rhabdomyolysis - treat with IV fluids

Important for me Less important

Intravenous fluids are the most important management step in the prevention of rhabdomyolysis in such patients

Dr Assem

A patient with type 1 diabetes mellitus is reviewed in the nephrology outpatient clinic. He is known to have stage 1 diabetic nephropathy. Which of the following best describes his degree of renal involvement?

- ☐ Latent phase
- ☐ Hyperfiltration
- ☐ End-stage renal failure
- ☐ Overt nephropathy
- ☐ Microalbuminuria

Latent phase

8%

Hyperfiltration

47%

End-stage renal failure

2%

Overt nephropathy

4%

Microalbuminuria

39%

For the purposes of the MRCP, increase in the glomerular filtration rate (GFR) is most characteristic of stage 1 diabetic nephropathy. It is however known that elevation of the GFR usually persists into stage 2

A 40-year-old man presents to the renal out-patient clinic after being referred by his GP following an incidental finding of microscopic haematuria at an insurance medical. He has never noted frank haematuria or renal angle pain before, and has otherwise been well. He denies any recent upper respiratory tract infections. There is no family history of renal failure or renal disease, although his brother and father have previously seen specialists because of 'blood in the urine', although both have since been discharged. On examination his blood pressure is 124/74 mmHg and his creatinine is in the normal range. A renal USS performed by his GP at the time of referral is normal. What is the most likely diagnosis?

- ☐ Thin basement membrane disease
- ☐ IgA nephropathy
- ☐ Renal lithiasis
- ☐ Acute interstitial nephritis
- ☐ Post streptococcal glomerulonephritis

Thin basement membrane disease

59%

IgA nephropathy

19%

Renal lithiasis

11%

Acute interstitial nephritis

6%

Post streptococcal glomerulonephritis

4%

Which one of the following factors is most associated with an increased risk of developing bladder cancer?

☐ Strongyloides stercoralis infection

☐ Beryllium salt exposure

☐ Aniline dye exposure

☐ Aflatoxin exposure

☐ Long term phenytoin use

Strongyloides stercoralis infection

9%

Beryllium salt exposure

5%

Aniline dye exposure

76%

Aflatoxin exposure

7%

Long term phenytoin use

4%

A 69-year-old man is started on tamsulosin for benign prostatic hyperplasia. Which one of the following best describes the side-effects he may experience?

- ☐ Urgency + insomnia
- ☐ Dizziness + postural hypotension
- ☐ Urinary retention + nausea
- ☐ Urgency + erectile dysfunction
- ☐ Erectile dysfunction + reduced libido

Urgency + insomnia

4%

Dizziness + postural hypotension

75%

Urinary retention + nausea

5%

Urgency + erectile dysfunction

5%

Erectile dysfunction + reduced libido

12%

A 20-year-old Nigerian female presents to the Emergency Department with chest pain. She reports a long history of fatigue and joint pains. Examination reveals a pericardial rub and bilateral pitting oedema. Observations show only that she has a low grade pyrexia 37.7°C and blood pressure 170/100 mmHg. Urinalysis shows haematuria and nephrotic-range proteinuria. A urine pregnancy test is negative. ECG shows saddle-shaped ST-elevation in all leads. Of interest, her blood results show:

Urea	8.2 mmol/l
Creatinine	212 µmol/l
eGFR	33ml/m/m ²

Which of the following histopathological findings is most likely on renal biopsy?

- ☐ Focal proliferative glomerulonephritis
- ☐ Membranous glomerulonephritis
- ☐ Diffuse proliferative glomerulonephritis
- ☐ Focal segmental glomerulosclerosis
- ☐ Mesangial proliferative glomerulonephritis

Focal proliferative glomerulonephritis	7%
Membranous glomerulonephritis	20%
Diffuse proliferative glomerulonephritis	46%
Focal segmental glomerulosclerosis	15%
Mesangial proliferative glomerulonephritis	12%

This question requires you to diagnose the condition and then recall the associated histopathology. Although they may not be encountered every day in clinical practice, the glomerulonephritides are favourites of the MRCP examiners.

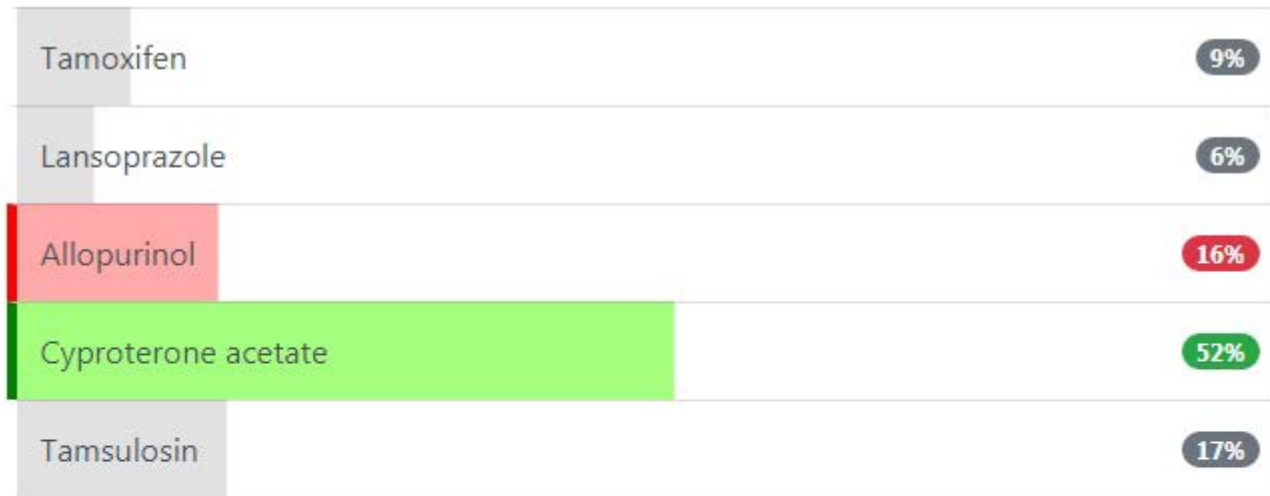
The presence of hypertension, kidney injury, proteinuria and haematuria point towards a nephritic picture of kidney insult.

The multisystem presentation of fever, arthralgia, pericarditis and nephritis associated with the epidemiological clues (a young black female) suggest in this case a diagnosis of systemic lupus erythematosus (SLE).

The most common histological pattern seen in lupus nephritis is diffuse proliferative glomerulonephritis.

A 72-year-old man is diagnosed with prostate cancer and goserelin (Zoladex) is prescribed. Which one of the following is it most important to co-prescribe for the first three weeks of treatment?

- ☐ Tamoxifen
- ☐ Lansoprazole
- ☐ Allopurinol
- ☐ Cyproterone acetate
- ☐ Tamsulosin



Anti-androgen treatment such as cyproterone acetate should be co-prescribed when starting gonadorelin analogues due to the risk of tumour flare. This phenomenon is secondary to initial stimulation of luteinising hormone release by the pituitary gland resulting in increased testosterone levels.

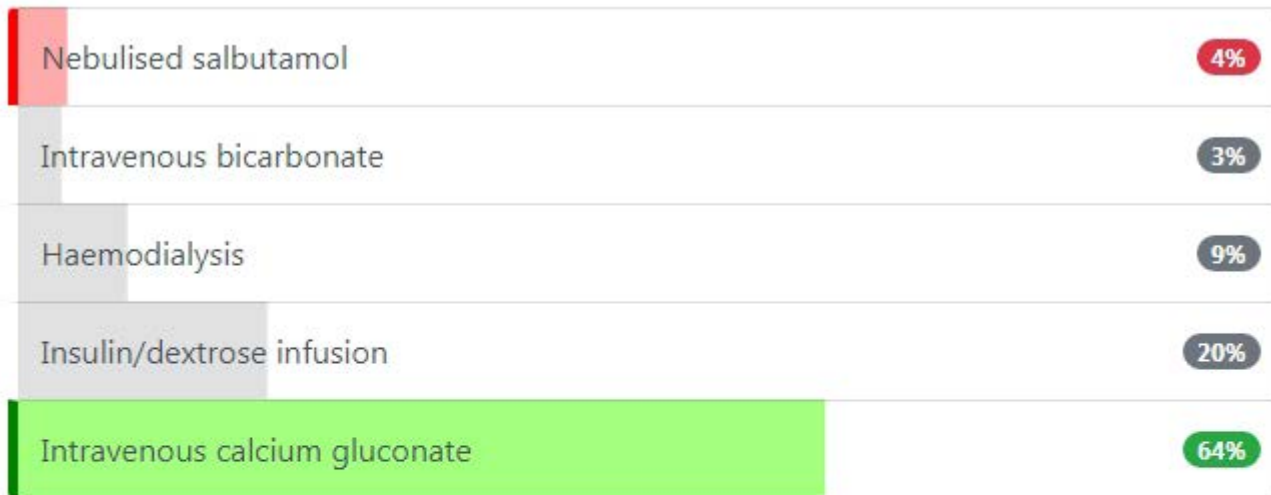
The BNF advises starting cyproterone acetate 3 days before the gonadorelin analogue.

A 45-year-old man is seen in the Emergency Department with nausea, pallor and lethargy. He has no past medical history of note. A cannula is inserted and bloods show the following

Na ⁺	140 mmol/l
K ⁺	6.7 mmol/l
Bicarbonate	14 mmol/l
Urea	18.2 mmol/l
Creatinine	230 µmol/l

What is the most appropriate initial management?

- ☐ Nebulised salbutamol
- ☐ Intravenous bicarbonate
- ☐ Haemodialysis
- ☐ Insulin/dextrose infusion
- ☐ Intravenous calcium gluconate



There is widespread variation in hyperkalaemia protocols. Some would only advocate giving calcium gluconate if there is evidence of ECG changes, or if the potassium is > 7.0 mmol/l. If this information is absent in a question it is safer to assume that the point they are 'getting at' is the priority of stabilising the myocardium, rather than lowering the serum potassium.

A 32-year-old woman comes to the immunology clinic for review. She has a history of SLE and stopped her medication prior to getting pregnant. She is now approaching 16 weeks gestation. Unfortunately her joint pains have returned, creatinine has risen from 90 $\mu\text{mol/l}$ to 146 $\mu\text{mol/l}$, with blood and proteinuria, despite high dose prednisolone.

Which of the following is the most appropriate next step?

- ☐ Azathioprine
- ☐ Ciclosporin
- ☐ Cyclophosphamide
- ☐ Methotrexate
- ☐ Mycophenolate

Azathioprine	45%
Ciclosporin	9%
Cyclophosphamide	21%
Methotrexate	8%
Mycophenolate	16%

A large body of evidence from the use of azathioprine in pregnancy for the treatment of both rheumatological conditions and inflammatory bowel disease, supports its use. Although it is less effective in the management of SLE with renal disease versus other options, balance of benefit risk makes it the preferred intervention.

Ciclosporin appears to be associated with premature delivery and low birth weight, although it does not seem to be associated with malformations, this drives its use as an alternative to azathioprine in patients who fail to gain control of their disease. Cyclophosphamide, methotrexate and mycophenolate are all contraindicated for use in pregnancy.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3237512/>

A 27-year-old man is investigated for haemoptysis. He is a non-smoker and has no respiratory history of note. Whilst awaiting a bronchoscopy he becomes lethargic and anorexic. Blood tests show the following:

Na ⁺	141 mmol/l
K ⁺	5.3 mmol/l
Urea	16.7 mmol/l
Creatinine	271 µmol/l

A renal biopsy is performed and shows linear IgG deposits along the basement membrane.

What type of antibodies are most likely to cause this type of presentation?

- ☐ cANCA
- ☐ IgA
- ☐ pANCA
- ☐ Anti-nuclear antibodies (ANA)
- ☐ Anti-glomerular basement membrane (anti-GBM) antibodies

Dr Assem

cANCA	11%
IgA	4%
pANCA	8%
Anti-nuclear antibodies (ANA)	3%
Anti-glomerular basement membrane (anti-GBM) antibodies	74%

Goodpasture's syndrome

- IgG deposits on renal biopsy
- anti-GBM antibodies

Important for me Less important

The combination of haemoptysis, renal failure and linear IgG deposits points to a diagnosis of Goodpasture's syndrome.

The ANCA-related nephropathies are associated with crescentic glomerulonephritis.

Each one of the following is associated with papillary necrosis, except:

- ☐ Acute pyelonephritis
- ☐ Tuberculosis
- ☐ Chronic analgesia use
- ☐ Syphilis
- ☐ Sickle cell disease

Acute pyelonephritis

17%

Tuberculosis

11%

Chronic analgesia use

14%

Syphilis

44%

Sickle cell disease

13%

Each one of the following is a cause of cranial diabetes insipidus, except:

- ☐ Pituitary surgery
- ☐ Lithium
- ☐ Histiocytosis X
- ☐ Craniopharyngioma
- ☐ Post head-injury

Pituitary surgery

4%

Lithium

77%

Histiocytosis X

11%

Craniopharyngioma

4%

Post head-injury

4%

Lithium causes a nephrogenic diabetes insipidus

Dr Assef

A 20-year-old man presents with facial and ankle swelling. This has slowly been developing over the past week. During the review of systems he describes passing 'frothy' urine. A urine dipstick shows protein +++. What is the most likely cause of this presentation?

- ☐ Minimal change disease
- ☐ IgA nephropathy
- ☐ Membranoproliferative glomerulonephritis
- ☐ Polycystic kidney disease
- ☐ Membranous glomerulonephritis

Minimal change disease

55%

IgA nephropathy

9%

Membranoproliferative glomerulonephritis

6%

Polycystic kidney disease

3%

Membranous glomerulonephritis

27%

Nephrotic syndrome in children / young adults - minimal change glomerulonephritis

Important for me Less important

Minimal change glomerulonephritis nearly always presents as nephrotic syndrome, accounting for 75% of cases in children and 25% in adults. The majority of cases are idiopathic and respond well to steroids.

Membranous glomerulonephritis would be unusual in a 20-year-old.

Dr Assem

Which one of the following is least recognised as a cause of membranous glomerulonephritis?

☐ Malaria

☐ Lymphoma

☐ Hepatitis B

☐ Cryoglobulinaemia

☐ Gold

Malaria

21%

Lymphoma

10%

Hepatitis B

12%

Cryoglobulinaemia

44%

Gold

13%

A 34-year-old man who has injected heroin for the past 10 years is admitted to the Emergency Department. You notice on the computer that his serum creatinine has been slowly rising over recent years. His latest results show the following:

Na ⁺	140 mmol/l
K ⁺	4.8 mmol/l
Bicarbonate	26 mmol/l
Urea	8.1 mmol/l
Creatinine	156 µmol/l

Urine dipstick	Protein ++, nil else
----------------	----------------------

What is the most likely cause of his deteriorating renal function?

- ☐ Focal segmental glomerulosclerosis
- ☐ Amyloidosis
- ☐ Mesangiocapillary glomerulonephritis
- ☐ Chronic pyelonephritis
- ☐ Renal vein thrombosis

Focal segmental glomerulosclerosis

67%

Amyloidosis

7%

Mesangiocapillary glomerulonephritis

13%

Chronic pyelonephritis

4%

Renal vein thrombosis

9%

Heroin is a known cause of focal segmental glomerulosclerosis.

A 43-year-old is referred to the renal clinic after presenting with peripheral oedema. He has no past medical history of note. Routine bloods ordered by his GP showed the following:

Hb	14.1 g/dl
Platelets	199 * 10 ⁹ /l
WBC	5.6 * 10 ⁹ /l

Na ⁺	141 mmol/l
K ⁺	4.8 mmol/l
Urea	8.3 mmol/l
Creatinine	143 µmol/l

Bilirubin	21 µmol/l
ALP	84 u/l
ALT	22 u/l
γGT	33 u/l
Albumin	26 g/l

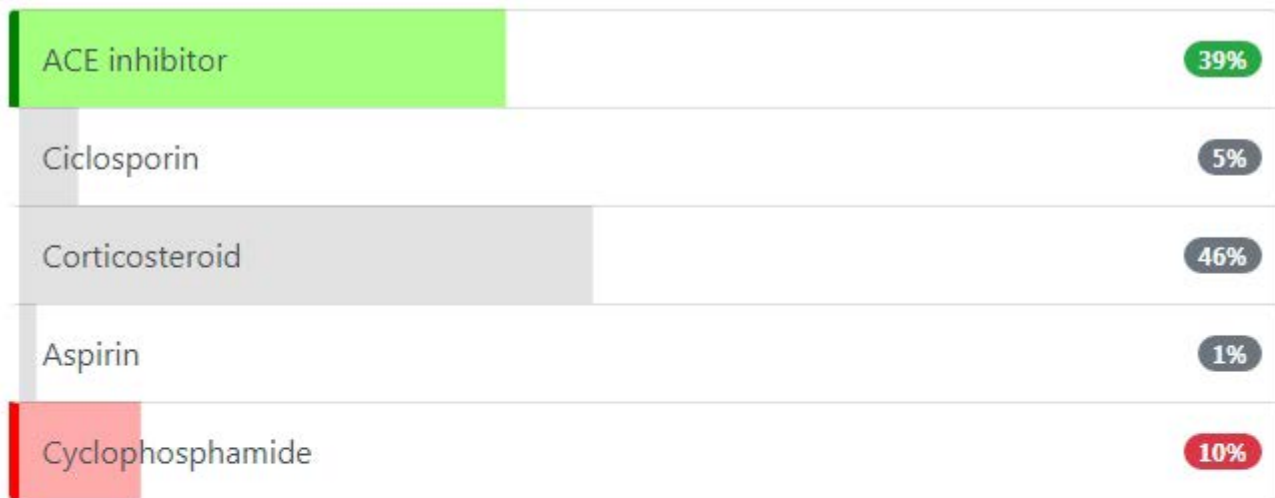
His urinary protein is 4.2g/24 hours. On examination in the clinic he has pitting oedema of the ankles and his blood pressure is 160/92 mmHg. A renal biopsy is ordered and reported as follows:

Light microscopy

Mesangium: normal, with no hypercellularity. The capillary walls are thickened. Subepithelial deposits are seen.

Given the likely diagnosis, which one of the following drugs is most likely to be beneficial?

- ☐ ACE inhibitor
- ☐ Ciclosporin
- ☐ Corticosteroid
- ☐ Aspirin
- ☐ Cyclophosphamide



This patient has membranous glomerulonephritis. The history is typical with a middle-aged man presenting with nephrotic syndrome and characteristic biopsy findings.

Corticosteroids by themselves have not been shown to be effective in membranous glomerulonephritis. ACE inhibitors have however been shown to reduce proteinuria.

A 24-year-old man who has a sister with adult polycystic kidney disease (ADPKD) asks if he could be screened for the disease. What is the most appropriate screening test?

- ☐ PKD1 gene testing
- ☐ CT abdomen
- ☐ Urine microscopy
- ☐ Ultrasound abdomen
- ☐ Anti-polycystin 1 antibodies levels

PKD1 gene testing

23%

CT abdomen

4%

Urine microscopy

4%

Ultrasound abdomen

65%

Anti-polycystin 1 antibodies levels

5%

Ultrasound is the screening test for adult polycystic kidney disease

Important for me Less important

Genetic testing is still not routinely recommended for screening family members.
Sensitivity for ADPKD1 is 99% for at-risk patients older than 20 years

A 56-year-old man who suffers from biventricular cardiac failure comes to the clinic for review. His symptoms are currently well controlled and he is taking Ramipril 10mg, spironolactone 25mg, bisoprolol 10mg, and furosemide 40mg. His main complaint is of painful gynaecomastia that he says has developed over the past 6 months. Physical exam reveals a blood pressure of 125/80 mmHg, and no residual signs of cardiac failure. Renal function is unchanged from 6 months earlier, with a stable creatinine at 125 $\mu\text{mol/l}$.

Which of the following is the most appropriate next step?

- ☐ Check is prolactin level
- ☐ Change the spironolactone to eplerenone
- ☐ Change the furosemide to indapamide
- ☐ Stop the bisoprolol
- ☐ Check his testosterone level

Check is prolactin level

7%

Change the spironolactone to eplerenone

80%

Change the furosemide to indapamide

5%

Stop the bisoprolol

3%

Check his testosterone level

4%

Eplerenone can be used in patients with troublesome gynaecomastia on spironolactone

Important for me Less important

This man has stable heart failure, his medication should therefore remain unaltered if possible. Spironolactone does however interfere with binding of testosterone to androgen receptors, increase metabolic clearance of testosterone, and results in increased metabolism of androgens to estradiol. This is the likely cause of his gynaecomastia. Eplerenone is an alternative aldosterone antagonist and is associated with up to 20 times less symptom burden with respect to gynaecomastia. It is therefore the most appropriate intervention here.

<https://www.medicines.org.uk/emc/medicine/29837>

At this stage there is little to be gained by checking the patient's testosterone level until the spironolactone is discontinued. Although bisoprolol may be associated with erectile dysfunction, this isn't mediated by anti-androgen activity, and it is not linked to the development of gynaecomastia. Changing the furosemide to a thiazide like diuretic may worsen symptoms of heart failure. High levels of prolactin are associated with galactorrhoea, not with gynaecomastia. There is little value therefore in checking prolactin levels here.



Discuss

Improve

Dr Assem

Each one of the following is a cause of nephrogenic diabetes insipidus, except:

☐ Hypocalcaemia

☐ Sickle-cell anaemia

☐ Lithium

☐ Hypokalaemia

☐ Demeclocycline

Hypocalcaemia

45%

Sickle-cell anaemia

15%

Lithium

9%

Hypokalaemia

15%

Demeclocycline

17%

A 35-year-old lady is found to have abnormal renal function on routine blood tests performed by her GP:

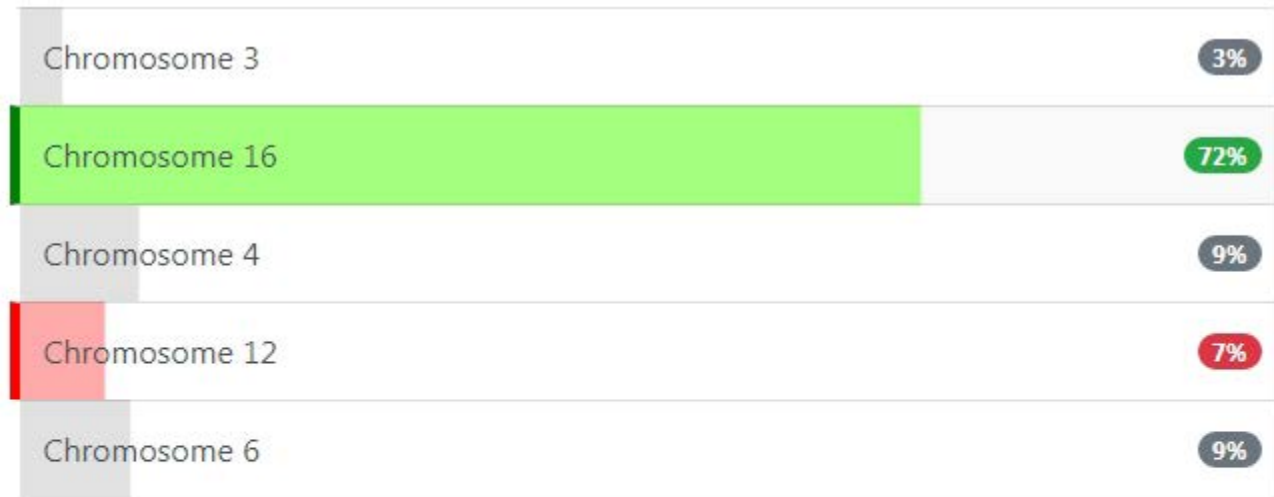
Na ⁺	142 mmol/l
K ⁺	4.1 mmol/l
Urea	19 mmol/l
Creatinine	230 µmol/l

A renal tract ultrasound demonstrates 3 cysts on her right kidney and 4 cysts on the left with no visible hydronephrosis. She reports that her father suffered from kidney trouble and was on dialysis from age 45.

On what chromosome is the most likely mutation?

- ☐ Chromosome 3
- ☐ Chromosome 16
- ☐ Chromosome 4
- ☐ Chromosome 12
- ☐ Chromosome 6

Dr Assem



This patient has autosomal dominant polycystic kidney disease (ADPKD) as demonstrated by her impaired renal function, bilateral renal cysts, and positive family history. The majority of patients with ADPKD have a mutation on chromosome 16, with the remaining 15% having a mutation on chromosome 4.

A 5-year-old boy is seen in the Emergency Department due to lethargy and pallor. There is no recent history of diarrhoea. The following results are obtained:

Hb	8.4 g/dl
Platelets	$30 \times 10^9/l$
Urea	24 mmol/l
Creatinine	164 $\mu\text{mol/l}$

Urinalysis reveals proteinuria and haematuria. What is the most appropriate management?

- ☐ IV cyclophosphamide
- ☐ Ciprofloxacin
- ☐ Oral prednisolone
- ☐ IV methylprednisolone followed by oral prednisolone
- ☐ Plasma exchange

Dr Assem

IV cyclophosphamide

5%

Ciprofloxacin

2%

Oral prednisolone

26%

IV methylprednisolone followed by oral prednisolone

22%

Plasma exchange

45%

There is no role for antibiotics, steroids or immunosuppressants in haemolytic uraemic syndrome (HUS). Plasma exchange may be indicated, particularly in severe cases of HUS not associated with diarrhoea

A 45-year-old presents to the Emergency Department with chest pain. An ECG shows anterior ST elevation and he is thrombolysed with alteplase. His chest pain settles and he is started on aspirin, atorvastatin, bisoprolol and ramipril. Four days later his blood results are as follows:

Urea	22 mmol/l
Creatinine	277 μ mol/l

What is the most likely cause for the deterioration in renal function?

- ☐ Renal artery stenosis
- ☐ NSAID related nephropathy
- ☐ Statin nephropathy
- ☐ Dressler's syndrome
- ☐ Haemorrhage into renal cyst

Renal artery stenosis	57%
NSAID related nephropathy	12%
Statin nephropathy	9%
Dressler's syndrome	13%
Haemorrhage into renal cyst	10%

Flash pulmonary oedema, U&Es worse on ACE inhibitor, asymmetrical kidneys → renal artery stenosis - do MR angiography

Important for me Less important

There is likely underlying renal artery stenosis revealed by the addition of an ACE inhibitor. Risk factors such as hypertension and hyperlipidaemia which have contributed to the development of his ischaemic heart disease also put him at risk of renal vascular disease

A 54-year-old truck driver presented to emergency department with a new onset severe back pain radiating to his groin. He required 10 mg of intravenous morphine to control his pain. He is not a smoker but drinks 10-12 pints on weekends. He has recently been diagnosed with esophageal cancer and has undertaken his first chemotherapy session the previous week. With regards to uric acid calculi, one of its remarkable characteristic is:

- ☐ They cannot be visualised by ultrasonography (US)
- ☐ They are radiolucent
- ☐ Hardly seen on plain CT (CT KUB)
- ☐ High solubility on acidic urine pH
- ☐ Poor response to medical treatment

They cannot be visualised by ultrasonography (US)

10%

They are radiolucent

71%

Hardly seen on plain CT (CT KUB)

7%

High solubility on acidic urine pH

8%

Poor response to medical treatment

4%

Uric acid nephrolithiasis are radiolucent, requiring ultrasonography or CT KUB (without contrast)

Important for me Less important

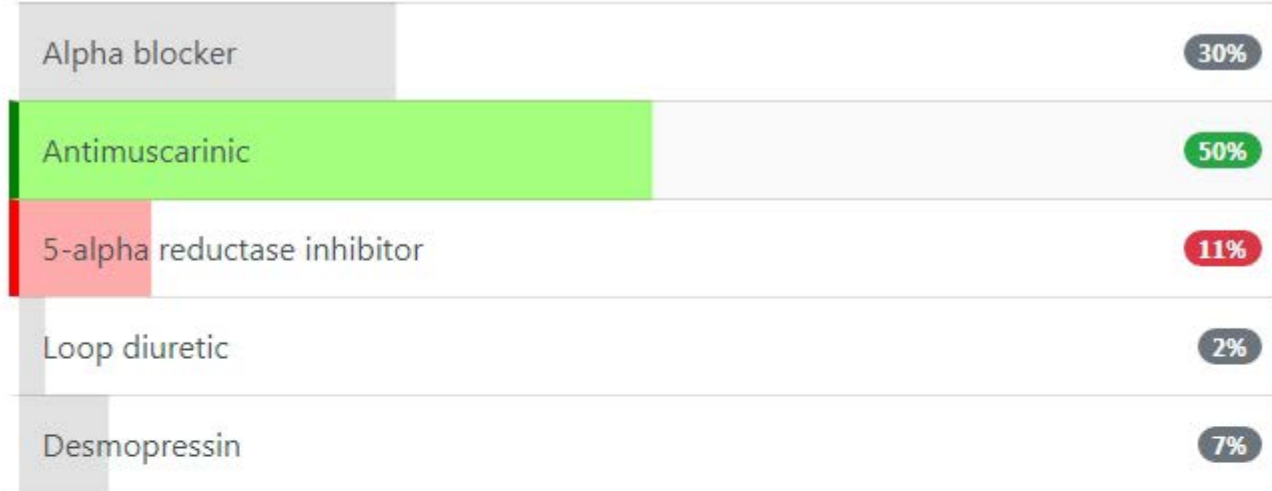
Uric acid nephrolithiasis are radiolucent, requiring ultrasonography or CT KUB (without contrast) instead of a plain film. With ultrasonography can demonstrate a calculi by an echogenic foci with distal acoustic shadowing regardless of its nature. They respond well to medical treatment which includes, hydration, urinary alkalinization and allopurinol if raised uric acid levels. Uricosuric medications should be avoided, especially in renal impairment, as it can precipitate the formation of new calculi.

Dr Assem

A 65-year-old man presents with lower urinary tract symptoms. For the past few months, he has had problems with urinary urgency and has had several episodes of incontinence when he could not reach the toilet in time. He describes good urinary flow with no hesitancy or straining. Urinalysis and prostate examination are unremarkable.

Which one of the following medications is most likely to help alleviate his symptoms?

- ☐ Alpha blocker
- ☐ Antimuscarinic
- ☐ 5-alpha reductase inhibitor
- ☐ Loop diuretic
- ☐ Desmopressin



Antimuscarinic drugs are useful in patients with an overactive bladder

Important for me Less important

This patient has symptoms of an overactive bladder. Conservative measures should be discussed and bladder training offered.

Examples of suitable antimuscarinic drugs include oxybutynin, tolterodine and darifenacin.

A patient is seen in clinic complaining of abdominal pain. Routine bloods show:

Na ⁺	142 mmol/l
K ⁺	4.0 mmol/l
Chloride	104 mmol/l
Bicarbonate	19 mmol/l
Urea	7.0 mmol/l
Creatinine	112 μ mol/l

What is the anion gap?

- ☐ 4 mmol/L
- ☐ 14 mmol/L
- ☐ 20 mmol/L
- ☐ 21 mmol/L
- ☐ 23 mmol/L



The anion gap may be calculated by using (sodium + potassium) - (bicarbonate + chloride)

$$= (142 + 4.0) - (104 + 19) = 23 \text{ mmol/L}$$

You are reviewing a 33-year-old man who has recently been diagnosed with adult polycystic kidney disease in the renal clinic. You proceed to examine his cardiovascular system. Which other feature are you most likely to find on examination?

- ☐ Dilated cardiomyopathy
- ☐ Mitral stenosis
- ☐ Aortic stenosis
- ☐ Renal bruit secondary to renal artery stenosis
- ☐ Mitral valve prolapse

Dilated cardiomyopathy

13%

Mitral stenosis

7%

Aortic stenosis

8%

Renal bruit secondary to renal artery stenosis

15%

Mitral valve prolapse

57%

A 14-year-old girl is referred to the paediatric unit with reduced urine output and lethargy. She has been passing bloody diarrhoea for the past four days. On admission she appears dehydrated. Bloods show the following:

Na ⁺	142 mmol/l
K ⁺	4.8 mmol/l
Bicarbonate	22 mmol/l
Urea	10.1 mmol/l
Creatinine	176 µmol/l

Hb	10.4 g/dl
MCV	90 fl
Plt	91 × 10 ⁹ /l
WBC	14.4 × 10 ⁹ /l

Given the likely diagnosis, which one of the following organisms is the most likely cause?

- ☐ *Campylobacter*
- ☐ Giardiasis
- ☐ *E. coli*
- ☐ *Salmonella*
- ☐ *Shigella*

Campylobacter

9%

Giardiasis

3%

E. coli

70%

Salmonella

5%

Shigella

13%

Haemolytic uraemic syndrome - classically caused by E coli 0157:H7

Important for me

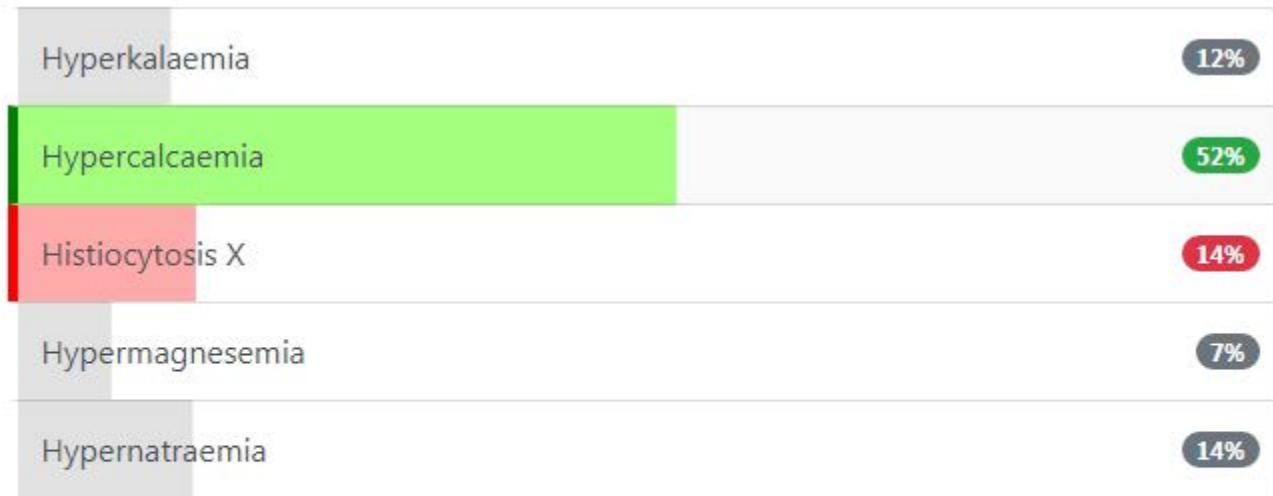
Less important

A 60-year-old woman presents to her general practice with signs of thirst and tiredness. On further questioning, she also complains of polyuria and nocturia. As a result a 24-hour urine is collected, which returns showing a urine osmolality of 189 mOsm/kg (500-800 mOsm/kg).

The general practitioner suspects a diagnosis of diabetes insipidus.

Which of the following is a recognised cause of nephrogenic diabetes insipidus?

- ☐ Hyperkalaemia
- ☐ Hypercalcaemia
- ☐ Histiocytosis X
- ☐ Hypermagnesemia
- ☐ Hypernatraemia



The polyuria and polydipsia, in combination with a dilute urine suggest diabetes insipidus. It is hypokalaemia, not hyperkalaemia, that causes nephrogenic diabetes insipidus whereas Histiocytosis X causes cranial diabetes insipidus.

A 40-year-old man with a history of psychiatric problems and epilepsy comes for review. He complains that he is drinking excessive amounts of water and having to urinate frequently. He has not lost any weight and states that he is compliant with his current medications. Blood tests show the following:

Na ⁺	145 mmol/l
K ⁺	4.1 mmol/l
Urea	6.3 mmol/l
Creatinine	101 µmol/l
Glucose (random)	6.2 mol/l

Which one of the following medications is most likely to be responsible for this presentation?

- ☐ Carbamazepine
- ☐ Fluoxetine
- ☐ Olanzapine
- ☐ Sodium valproate
- ☐ Lithium



This patient has probably developed nephrogenic diabetes insipidus secondary to lithium therapy. Polyuria, polydipsia and a high-normal sodium are pointers towards this.

A 62-year-old man with a diabetic nephropathy and hypertension is reviewed. His current medication is insulin, bendroflumethiazide, ramipril and amlodipine. On examination blood pressure is 144/78 mmHg. Blood tests reveal the following:

Na ⁺	139 mmol/l
K ⁺	4.9 mmol/l
Urea	12.8 mmol/l
Creatinine	215 µmol/l
eGFR	29 ml/min

Renal function was similar to 3 months ago. What is the most appropriate action?

- ☐ No change to his medication
- ☐ Switch bendroflumethiazide to furosemide
- ☐ Add a beta-blocker
- ☐ Add spironolactone
- ☐ Stop ramipril

No change to his medication

30%

Switch bendroflumethiazide to furosemide

31%

Add a beta-blocker

12%

Add spironolactone

13%

Stop ramipril

16%

As the eGFR is 29 ml/min switching bendroflumethiazide to furosemide would be the next step in controlling his blood pressure. Please see the guidelines in the external links section

A 45-year-old female with nephrotic syndrome develops renal vein thrombosis. What changes in patients with nephrotic syndrome predispose to the development of venous thromboembolism?

- ☐ Reduced excretion of protein S
- ☐ Loss of antithrombin III
- ☐ Reduced excretion of protein C
- ☐ Loss of fibrinogen
- ☐ Reduced metabolism of vitamin K

Reduced excretion of protein S

4%

Loss of antithrombin III

78%

Reduced excretion of protein C

9%

Loss of fibrinogen

5%

Reduced metabolism of vitamin K

3%

A 77-year-old woman on your ward has chronic kidney disease. Blood results are below. You have been asked to prescribe a suitable therapy.

Phosphate	1.8 mmol/l
PTH	85 pg/ml

Of the following, which is most likely to correct vitamin D deficiency in your patient?

- ☐ Sando-K (effervescent potassium)
- ☐ Calcium carbonate
- ☐ Phosphate sandoz (effervescent phosphate)
- ☐ Thiamine
- ☐ Alfacalcidol

Sando-K (effervescent potassium)	3%
Calcium carbonate	14%
Phosphate sandoz (effervescent phosphate)	6%
Thiamine	3%
Alfacalcidol	73%

Alfacalcidol is used as a vitamin D supplement in end-stage renal disease because it does not require activation in the kidneys

Important for me Less important

Vitamin D has several forms and requires hydroxylation in the kidneys before it is active. In patients with severe renal impairment, alfacalcidol does not require activation in the kidneys and therefore is useful for replacing vitamin D.

Sando-K and phosphate sandoz would increase potassium and phosphate respectively so would not treat the patient.

Thiamine is a vitamin B replacement.

Calcium carbonate is a phosphate binder used in chronic kidney disease, but would not supplement vitamin D specifically.

A 69-year-old woman is admitted with a third episode of urinary tract infection over the past 12 months, proven on urine culture to be due to *Proteus mirabilis*. She also has right loin pain. She has a past history of hypertension and a previous creatinine tested one month earlier was elevated at 145 micromol/l. A plain x-ray to display kidneys ureters and bladder and an ultrasound of the urinary tract reveal a right staghorn calculus.

What is the stone likely to be composed of?

- ☐ Calcium phosphate
- ☐ Urate
- ☐ Magnesium ammonium phosphate
- ☐ Cystine
- ☐ Oxalate

Calcium phosphate	6%
Urate	4%
Magnesium ammonium phosphate	76%
Cystine	6%
Oxalate	7%

Magnesium ammonium phosphate, (also known as struvite), kidney stones are formed by urea-splitting bacteria, of which *Proteus* is an example. Magnesium ammonium phosphate stones can form very large calculi known as staghorn calculi which may significantly impact on renal function due to chronic obstruction and failure to clear urinary tract infection adequately. Treatment of the underlying urinary tract infection, coupled with a urology consult to assess the need for removal of any larger stones are the cornerstone of management.

Calcium phosphate renal stones are associated with hyperparathyroidism, and urate stones are associated with gout. Cystine stones are seen in patients with inherited cystinuria, and oxalate stones are primarily associated with short bowel syndrome.

A 10-year-old boy is admitted to hospital with diarrhoea and lethargy. There is a known local outbreak of E coli 0157:H7 and his initial bloods show evidence of acute renal failure. Given the likely diagnosis, which one of the following investigation results would be expected?

- ☐ Increased prothrombin time
- ☐ Thrombocytosis
- ☐ Fragmented red blood cells
- ☐ Right-shift of the white blood cells
- ☐ Raised serum haptoglobins

Increased prothrombin time

8%

Thrombocytosis

9%

Fragmented red blood cells

66%

Right-shift of the white blood cells

6%

Raised serum haptoglobins

11%

Serum haptoglobins (which bind haemoglobin) and the platelet count are decreased in haemolytic uraemic syndrome.

A 43-year-old man has a work-up for hypertension. He has found to have blood + on a urine dipstick of a freshly voided sample. Which one of the following may account for this finding?

- ☐ Smoking
- ☐ Exercise
- ☐ Obesity
- ☐ Eating red meat the previous day
- ☐ Use of ramipril

Smoking

8%

Exercise

67%

Obesity

2%

Eating red meat the previous day

16%

Use of ramipril

7%

Which one of the following types of glomerulonephritis is most characteristically associated with Wegener's granulomatosis?

- ☐ Mesangiocapillary glomerulonephritis
- ☐ Membranous glomerulonephritis
- ☐ Rapidly progressive glomerulonephritis
- ☐ Focal segmental glomerulosclerosis
- ☐ Diffuse proliferative glomerulonephritis

Mesangiocapillary glomerulonephritis

12%

Membranous glomerulonephritis

10%

Rapidly progressive glomerulonephritis

59%

Focal segmental glomerulosclerosis

9%

Diffuse proliferative glomerulonephritis

9%

Rapidly progressive glomerulonephritis, causes:

- Goodpasture's
- ANCA positive vasculitis

Important for me Less important

A 29-year-old man who is being investigated for haemoptysis and a chronic cough has a blood screen:

Hb	12.9 g/dl
Plt	248 * 10 ⁹ /l
WBC	5.4 * 10 ⁹ /l
ESR	11 mm/hr
Na ⁺	138 mmol/l
K ⁺	5.0 mmol/l
Bicarbonate	19 mmol/l
Urea	14.0 mmol/l
Creatinine	178 µmol/l

Urine dipstick shows blood ++. What is the most likely diagnosis?

- ☐ Wegener's granulomatosis
- ☐ Lung cancer with renal metastases
- ☐ Churg-Strauss syndrome
- ☐ Renal cancer with lung metastases
- ☐ Goodpasture's syndrome

Wegener's granulomatosis

26%

Lung cancer with renal metastases

2%

Churg-Strauss syndrome

7%

Renal cancer with lung metastases

2%

Goodpasture's syndrome

63%

The age of the patient and normal ESR point to a diagnosis of Goodpasture's syndrome.

You review a 65-year-old man with stage 5 chronic kidney disease in the renal outpatient clinic. He has recently been started on erythropoietin injections. Which one of the following is the main benefit this treatment?

- ☐ Reduced proteinuria
- ☐ Improved exercise tolerance
- ☐ Reduced blood pressure
- ☐ Improved renal function
- ☐ Reduced long-term all-cause mortality

Reduced proteinuria

2%

Improved exercise tolerance

66%

Reduced blood pressure

3%

Improved renal function

4%

Reduced long-term all-cause mortality

25%

Erythropoietin treats CKD associated anaemia which in turn would improve exercise tolerance. It does not improve renal function.

A 19-year-old woman is referred to the nephrology department after experiencing several episodes of visible haematuria. There is no history of abdominal or loin pain. These typically seem to occur within a day or two of developing tonsillitis. Blood pressure is 148/90 mmHg.

Urine dipstick is normal. Blood tests show the following:

Na ⁺	142 mmol/l
K ⁺	4.1 mmol/l
Bicarbonate	24 mmol/l
Urea	3.5 mmol/l
Creatinine	71 µmol/l

Given the likely diagnosis, which one of the following is a marker of poor prognosis?

- ☐ Female gender
- ☐ Hypertension
- ☐ Frank haematuria
- ☐ Absence of proteinuria
- ☐ Development of the disease before the age of 20 years

Dr Assem

Female gender

10%

Hypertension

53%

Frank haematuria

14%

Absence of proteinuria

9%

Development of the disease before the age of 20 years

14%

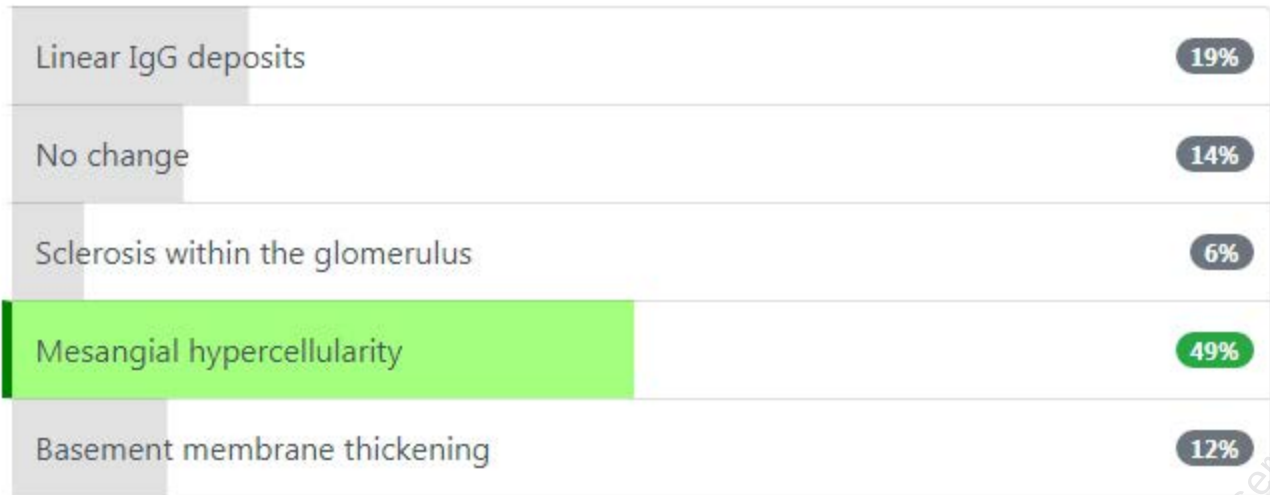
A 12-year-old boy is investigated for a purpuric rash on the extensor surfaces of his lower legs. He also has a history of abdominal pain and an urticarial rash. The following results are obtained:

Urine dipstick:

blood ++

What would be the likely finding on renal biopsy?

- ☐ Linear IgG deposits
- ☐ No change
- ☐ Sclerosis within the glomerulus
- ☐ Mesangial hypercellularity
- ☐ Basement membrane thickening



Henoch-Schonlein purpura is associated with IgA nephropathy

A 68-year-old man presents with symptoms of nocturia and difficulty in passing urine. He is not known to have any previous prostatic problems and denies any dysuria. Following a digital rectal examination, he is started on finasteride and tamsulosin. Three months later he presents to the emergency department in urinary retention and is catheterized, and a craggy mass is felt on rectal examination. He is referred to a urologist, and a prostatic ultrasound and needle biopsy are arranged, and prostate serum antigen (PSA) is requested.

Which of the following factors is most likely to give a false negative PSA?

- ☐ Tamsulosin
- ☐ Finasteride
- ☐ Prostatic needle biopsy
- ☐ Prostatic ultrasound
- ☐ Recent catheterisation

Tamsulosin

10%

Finasteride

58%

Prostatic needle biopsy

13%

Prostatic ultrasound

2%

Recent catheterisation

17%

Finasteride is the only factor likely to decrease the level of serum PSA. Tamsulosin has no effect on PSA, whilst prostatic needle biopsy, US and catheterisation have all been shown to cause a transient increase in PSA. A PR examination may also cause a slight rise in PSA levels. Therefore, these factors could cause a false positive result, whilst finasteride is the only possible factor which could cause a false negative one.

Source:

Sturgeon, C. M., L. C. Lai, and M. J. Duffy. 'Serum Tumour Markers: How to Order and Interpret Them.' BMJ (2009): 852-58

Dr Assem

A 33-year-old pregnant woman presents for advice. She is known to have polycystic kidney disease but is currently well. Her father also has polycystic kidneys and is on dialysis . What is the chance her child will also have the disease?

☐ 50% if male

☐ 50%

☐ 25%

☐ 0%

☐ 100%

50% if male

8%

50%

69%

25%

10%

0%

3%

100%

9%

Polycystic kidney disease is usually inherited in an autosomal dominant fashion and hence 50% of her children will be affected, regardless of gender. The autosomal recessive form is rare and usually causes death in childhood.

A 25-year-old man has a renal biopsy due to worsening renal function. This reveals linear IgG deposits along the basement membrane. What is the most likely diagnosis?

- ☐ Systemic lupus erythematosus
- ☐ IgA nephropathy
- ☐ Minimal change disease
- ☐ Post-streptococcal glomerulonephritis
- ☐ Goodpasture's syndrome

Systemic lupus erythematosus

11%

IgA nephropathy

13%

Minimal change disease

12%

Post-streptococcal glomerulonephritis

15%

Goodpasture's syndrome

49%

Goodpasture's syndrome

- IgG deposits on renal biopsy
- anti-GBM antibodies

Important for me Less important

These changes are characteristic of Goodpasture's syndrome.

Dr Assem

A 34-year-old man is investigated for recurrent renal stones. He has been hospitalised on multiple occasions and has required lithotripsy three times. Investigations show the following:

Calcium	2.08 mmol/l
Phosphate	0.85 mmol/l
Parathyroid hormone	4.1 pmol/L (normal range = 0.8 - 8.5)

24 hour urinary calcium	521 mg/24 hours (normal range < 300)
-------------------------	--------------------------------------

Which one of the following treatments is most likely to reduce the incidence of renal stones?

- ☐ Pyridoxine
- ☐ Bicarbonate supplements
- ☐ Bisphosphonates
- ☐ Parathyroidectomy
- ☐ Indapamide



The fact that thiazide diuretics cause hypercalcaemia is sometimes confused with their role in preventing calcium renal stones - the hypercalcaemia seen is secondary to increased distal tubular calcium resorption and hence lower calcium concentration in the urine.

There are some studies currently looking at the role of bisphosphonates in hypercalciuria but their long-term benefit is not yet established and thiazides remain the first-line treatment.

A 52-year-old with a history of arthritis, previous gastric ulcers, diabetic and hypertension has been vomiting and having diarrhoea for the last 12 hours. He takes naproxen, misoprostol, levothyroxine, linagliptin and long-acting insulin. With regards to glomerular filtration, which of the following can reduce glomerular filtration and contribute to development of an acute kidney injury?

- ☐ Naproxen
- ☐ Misoprostol
- ☐ Levothyroxine
- ☐ Linagliptin
- ☐ Long acting insulin

Naproxen	84%
Misoprostol	6%
Levothyroxine	2%
Linagliptin	6%
Long acting insulin	2%

NSAIDs and ACE-inhibitors/ARB cause prerenal acute kidney injury by decreasing the glomerular filtration

Important for me Less important

Non-steroidal anti-inflammatory drugs (NSAIDs), such as Naproxen are prostaglandin inhibitors therefore they constrict the afferent arterioles causing prerenal acute kidney injury by decreasing the glomerular filtration.

Misoprostol is a prostaglandin analogue, therefore can dilate the afferent arterioles and does not reduce glomerular filtrate.

Levothyroxine and linagliptin has little or none effect on the kidneys. Moreover, because linagliptin is not excreted by kidneys it is not necessary to reduce its dose in renal impairment.

Long acting insulin is excreted by the kidney (dose should be reduced in renal impairment) but does not contribute directly to glomerular filtration.

Autosomal dominant polycystic kidney disease type 2 is associated with a gene defect in:

- ☐ Chromosome 4
- ☐ Chromosome 8
- ☐ Chromosome 12
- ☐ Chromosome 16
- ☐ Chromosome 20

Chromosome 4

62%

Chromosome 8

7%

Chromosome 12

7%

Chromosome 16

22%

Chromosome 20

3%

ADPKD type 2 = chromosome 4 = 15% of cases

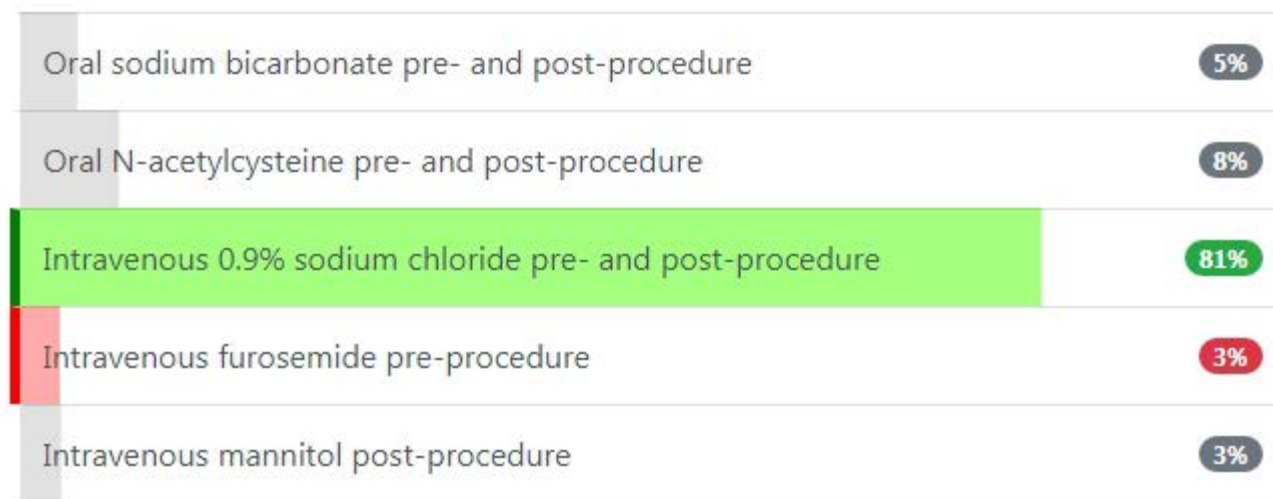
Important for me Less important

A 70-year-old man has been admitted with abdominal pain. The surgeons wish to perform a contrast-enhanced CT but are concerned because he has chronic kidney disease stage 3. His latest renal function is shown below:

Na ⁺	142 mmol/l
K ⁺	4.6 mmol/l
Urea	8.1 mmol/l
Creatinine	130 µmol/l

Which one of the following is the most important step in reducing the risk of contrast-induced nephropathy?

- ☐ Oral sodium bicarbonate pre- and post-procedure
- ☐ Oral N-acetylcysteine pre- and post-procedure
- ☐ Intravenous 0.9% sodium chloride pre- and post-procedure
- ☐ Intravenous furosemide pre-procedure
- ☐ Intravenous mannitol post-procedure



The evidence base is much stronger for volume expansion with normal saline than for N-acetylcysteine.

A 6-year-old boy is referred to clinic due to recurrent renal calculi. His grandmother also had a similar problem. What is the most likely diagnosis?

- ☐ Marfan's syndrome
- ☐ Familial gout nephropathy
- ☐ Homocystinuria
- ☐ Cystinuria
- ☐ Cystinosis

Marfan's syndrome

2%

Familial gout nephropathy

7%

Homocystinuria

21%

Cystinuria

61%

Cystinosis

10%

Which one of the following is not a feature of HIV-associated nephropathy?

- ☐ Small kidneys
- ☐ Normotension
- ☐ Elevated urea and creatinine
- ☐ Proteinuria
- ☐ Focal segmental glomerulosclerosis on renal biopsy

Small kidneys

55%

Normotension

19%

Elevated urea and creatinine

5%

Proteinuria

6%

Focal segmental glomerulosclerosis on renal biopsy

14%

An 18-year-old girl who is deaf and has a history of renal impairment is reviewed in clinic. She has previously been diagnosed with Alport's syndrome but is thinking about having children and asks about the risks of passing the condition on. What is the mode of inheritance of Alport's syndrome in the majority of cases?

- ☐ X-linked dominant
- ☐ Mitochondrial
- ☐ Autosomal recessive
- ☐ Autosomal dominant
- ☐ X-linked recessive

X-linked dominant

38%

Mitochondrial

3%

Autosomal recessive

20%

Autosomal dominant

18%

X-linked recessive

21%

Alport's syndrome - X-linked dominant (in the majority)

Important for me Less important

Around 10-15% of cases are inherited in an autosomal recessive fashion with rare autosomal dominant variants also existing

Which one of the following is least recognised as an indication for plasma exchange?

- ☐ Guillain-Barre syndrome
- ☐ Churg-Strauss syndrome
- ☐ Myasthenia gravis
- ☐ Cerebral malaria
- ☐ Goodpasture's syndrome

Guillain-Barre syndrome

8%

Churg-Strauss syndrome

23%

Myasthenia gravis

9%

Cerebral malaria

43%

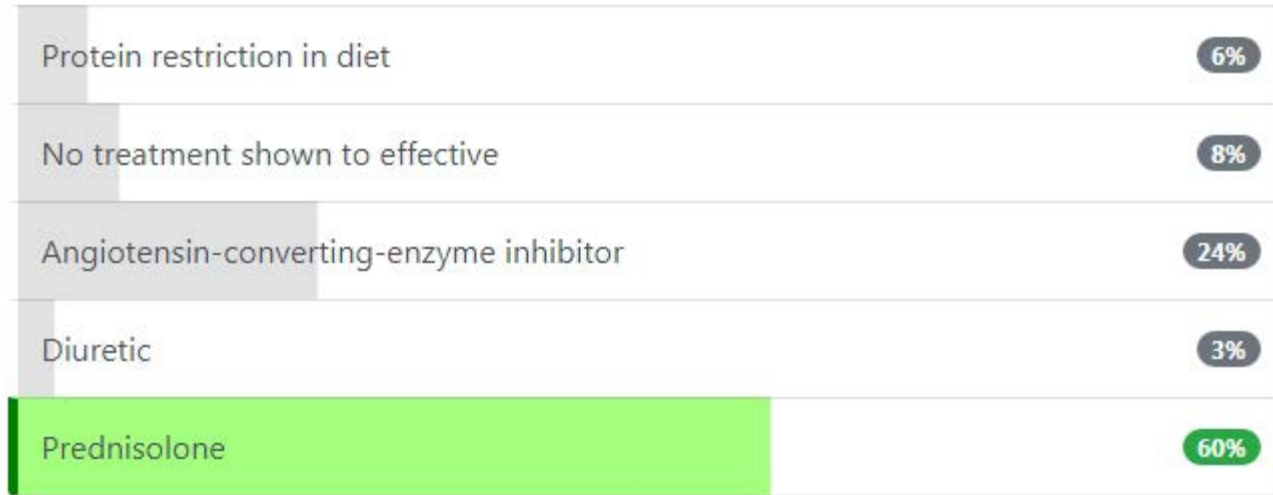
Goodpasture's syndrome

16%

Cerebral malaria is not a standard indication for plasma exchange. Exchange transfusions have been tried but it is generally only justified when peripheral parasitemia is greater than 10% of circulating erythrocytes. The role of blood transfusions remains controversial, as they are both expensive and potentially dangerous in many malaria areas

A 24-year-old woman is diagnosed as having nephrotic syndrome after being investigated for proteinuria. A diagnosis of minimal change glomerulonephritis is made. What is the most appropriate initial treatment to reduce proteinuria?

- ☐ Protein restriction in diet
- ☐ No treatment shown to effective
- ☐ Angiotensin-converting-enzyme inhibitor
- ☐ Diuretic
- ☐ Prednisolone



Minimal change glomerulonephritis - prednisolone

Important for me Less important

Angiotensin-converting-enzyme inhibitors may be used to reduce proteinuria in patients with heavy proteinuria or who have a slow response to prednisolone

A 63-year-old man is admitted with severe right sided loin pain to the Emergency Department. A urine dipstick shows blood +++, leucocytes +, protein +. An abdominal radiograph is therefore ordered which shows a stag-horn calculus in the right renal pelvis. What are stag-horn calculi normally composed of?

- ☐ Xanthine
- ☐ Magnesium ammonium phosphate
- ☐ Calcium oxalate
- ☐ Uric acid
- ☐ Magnesium calcium phosphate

Xanthine

6%

Magnesium ammonium phosphate

64%

Calcium oxalate

17%

Uric acid

4%

Magnesium calcium phosphate

9%

Stag-horn calculi

- composed of **Struvite** (ammonium magnesium phosphate, triple phosphate)
- form in alkaline urine (ammonia producing bacteria such as *Ureaplasma urealyticum* and *Proteus* therefore predispose)

Important for me Less important

Which of the following factors would suggest that a patient has established acute tubular necrosis rather than pre-renal uraemia?

- ☐ Urine sodium = 10 mmol/L
- ☐ Fractional urea excretion = 20%
- ☐ Increase in urine output following fluid challenge
- ☐ Specific gravity = 1025
- ☐ Fractional sodium excretion = 1.5%

Urine sodium = 10 mmol/L

13%

Fractional urea excretion = 20%

20%

Increase in urine output following fluid challenge

7%

Specific gravity = 1025

16%

Fractional sodium excretion = 1.5%

44%

ATN or prerenal uraemia? In prerenal uraemia think of the kidneys holding on to sodium to preserve volume

Important for me Less important

You are prescribing maintenance fluids for a 60-year-old woman who has had a stroke. Her most recent blood results are shown below:

Na ⁺	140 mmol/l
K ⁺	4.0 mmol/l
Urea	5.0 mmol/l
Creatinine	88 µmol/l

She weighs 62 kg. What is the most appropriate amount of potassium that she should receive over a 24-hour period?

☐ 20 mmol

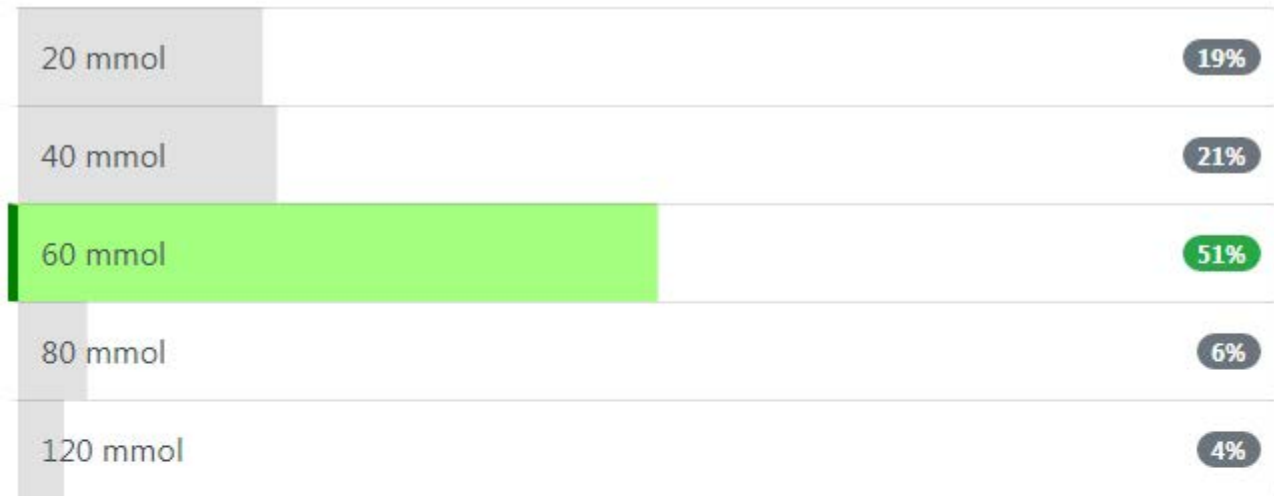
☐ 40 mmol

☐ 60 mmol

☐ 80 mmol

☐ 120 mmol

Dr Assem



When prescribing fluids, the potassium requirement per day is 1 mmol/kg/day

Important for me [Less important](#)

Converting this into real-world practice, NICE also recommends that patients have 25-30ml/kg/day of water. As this patient weighs 62kg that means the patient should receive approximately 1.5 - 2L of fluid in a 24 hour period. If the patient is receiving 1-litre bags of fluid then one should contain 40 mmol and the other 20 mmol potassium to ensure an adequate potassium intake.

A 34-year-old man presents to the Emergency Department with abdominal pain. This started earlier on in the day and is getting progressively worse. The pain is located on his left flank and radiates down into his groin. He has had not had a similar pain before and is normally fit and well. Examination reveals a man who is flushed and sweaty but is otherwise unremarkable. What is the most suitable initial management?

- ☐ Oral ciprofloxacin
- ☐ IM diclofenac 75 mg
- ☐ Immediate abdominal ultrasound
- ☐ IM morphine 5 mg
- ☐ IM diclofenac 75 mg + start bendroflumethiazide to prevent further episodes

Oral ciprofloxacin

6%

IM diclofenac 75 mg

61%

Immediate abdominal ultrasound

16%

IM morphine 5 mg

9%

IM diclofenac 75 mg + start bendroflumethiazide to prevent further episodes

9%

Guidelines continue to recommend the use of IM diclofenac in the acute management of renal colic

Important for me Less important

This man may need to be referred acutely to the surgeons for pain relief and investigations to exclude obstruction. It would not be suitable to start bendroflumethiazide in the initial phase of the first episode. An immediate abdominal ultrasound is not necessary as neither his age nor symptoms point to a diagnosis of abdominal aneurysm.

Dr Assem

Which one of the following is the most common type of SLE associated renal disease?

- ☐ Class II: mesangial glomerulonephritis
- ☐ Class III: focal (and segmental) proliferative glomerulonephritis
- ☐ Class IV: diffuse proliferative glomerulonephritis
- ☐ Class V: diffuse membranous glomerulonephritis
- ☐ Class VI: sclerosing glomerulonephritis

Class II: mesangial glomerulonephritis

7%

Class III: focal (and segmental) proliferative glomerulonephritis

16%

Class IV: diffuse proliferative glomerulonephritis

54%

Class V: diffuse membranous glomerulonephritis

17%

Class VI: sclerosing glomerulonephritis

6%

Diffuse proliferative glomerulonephritis is the most common and severe form of renal disease in SLE patients

Important for me Less important

A 43-year-old man is investigated for a painless testicular swelling. Following a biopsy, he is diagnosed as having a seminoma.

Which one of the following tumour markers is most specific for this condition?

☐ AFP

☐ LDH

☐ hCG

☐ S-100

☐ CA 15-3

AFP

24%

LDH

9%

hCG

51%

S-100

12%

CA 15-3

4%

hCG is associated with testicular seminomas

Important for me Less important

Which one of the following causes of glomerulonephritis is associated with normal complement levels?

- ☐ Post-streptococcal glomerulonephritis
- ☐ Mesangiocapillary glomerulonephritis
- ☐ Subacute bacterial endocarditis
- ☐ Goodpasture's syndrome
- ☐ Systemic lupus erythematosus

Post-streptococcal glomerulonephritis	15%
Mesangiocapillary glomerulonephritis	21%
Subacute bacterial endocarditis	15%
Goodpasture's syndrome	43%
Systemic lupus erythematosus	6%

Goodpasture's syndrome is rare condition associated with both pulmonary haemorrhage and rapidly progressive glomerulonephritis. It is caused by anti-glomerular basement membrane (anti-GBM) antibodies against type IV collagen. Complement levels are normal

A 33-year-old man with a history of coeliac disease is admitted for investigation of recurrent macroscopic haematuria. His urine is typically brown and there is no history of passing clots. What is the most likely diagnosis?

- ☐ Diffuse proliferative glomerulonephritis
- ☐ IgA nephropathy
- ☐ Membranous glomerulonephritis
- ☐ Minimal change disease
- ☐ Rapidly progressive glomerulonephritis

Diffuse proliferative glomerulonephritis

10%

IgA nephropathy

60%

Membranous glomerulonephritis

16%

Minimal change disease

4%

Rapidly progressive glomerulonephritis

10%

This man has IgA nephropathy which is associated with coeliac disease

A 65-year-old man who is known to have colorectal cancer is referred to the renal clinic. His GP performed a protein-creatinine ratio as he had been complaining of 'frothy' urine. The results suggest nephrotic range proteinuria which is confirmed on a 24-hour urinary collection. Assuming the proteinuria is related to his colorectal cancer what is the renal histology most likely to show?

- ☐ Mesangiocapillary glomerulonephritis
- ☐ Minimal change glomerulonephritis
- ☐ Focal segmental glomerulosclerosis
- ☐ Membranous glomerulonephritis
- ☐ Membranoproliferative glomerulonephritis

Mesangiocapillary glomerulonephritis

8%

Minimal change glomerulonephritis

6%

Focal segmental glomerulosclerosis

15%

Membranous glomerulonephritis

56%

Membranoproliferative glomerulonephritis

15%

Nephrotic syndrome - malignancies cause membranous glomerulonephritis

Important for me Less important

Patients with underlying malignancies such as lung, colon and gastric cancer may develop nephrotic syndrome as a paraneoplastic complication. There appears to be an association with HLA-DR3.

Lymphomas tend to be associated with minimal change disease.

A 31-year-old man presents to his GP with a 2-month history of constant abdominal pain and early satiety. He has hypertension for which he takes enalapril.

On examination, he is mildly tender in both flanks. Well-circumscribed masses are palpable in both left and right flanks. A soft systolic murmur is heard loudest at the apex.

His observations are heart rate 67/min, blood pressure 152/94mmHg, temperature 37.2°C, respiratory rate 14/min, saturations 97%.

Which additional feature is most likely to be found in this patient?

- ☐ Hepatomegaly
- ☐ Colonic polyps
- ☐ Sensorineural deafness
- ☐ Angiofibromas
- ☐ Thrombocytopenia

Hepatomegaly	37%
Colonic polyps	12%
Sensorineural deafness	24%
Angiofibromas	22%
Thrombocytopenia	4%

ADPKD is associated with hepatomegaly (due to hepatic cysts)

Important for me Less important

The patient in this case has autosomal-dominant polycystic kidney disease (ADPKD). ADPKD often presents with abdominal pain and early satiety as the kidneys occupy a large volume of the abdomen. Traction on the kidney pedicle can also cause pain. The presence of hypertension, bilateral flank masses and a systolic apical murmur (suggesting mitral valve disease) also point towards this diagnosis.

Extra-renal features of ADPKD include:

- Hepatic cysts which manifest as hepatomegaly
- Diverticulosis
- Intracranial aneurysms
- Ovarian cysts

Colonic polyps are not a feature of ADPKD.

Angiofibromas are a feature of tuberous sclerosis (patients with this disease may have renal cysts). Tuberous sclerosis is usually diagnosed in childhood and is associated with epilepsy and cognitive impairment.

Sensorineural deafness is associated with Alport's syndrome. Alport's syndrome typically presents with haematuria and progressive renal failure, not renal enlargement.

Thrombocytopenia is not a feature of ADPKD.

82-year-old female with a background of rheumatoid arthritis on maintenance dose prednisolone and sulfasalazine is admitted with deteriorating renal function. Urine dip reveals protein +++. She has previously suffered from a distal radial fracture and is currently complaining of numbness and tingling down the lateral 3 1/2 digits of the opposite hand.

Renal ultrasound reveals bilaterally enlarged kidneys and a subcutaneous abdominal fat biopsy is positive after Congo red staining. What is the most likely unifying diagnosis?

- ☐ Diabetes
- ☐ AL amyloidosis
- ☐ AA amyloidosis
- ☐ Waldenstrom macroglobulinaemia
- ☐ Systemic lupus erythematosus

Diabetes	3%
AL amyloidosis	41%
AA amyloidosis	47%
Waldenstrom macroglobulinaemia	6%
Systemic lupus erythematosus	3%

Secondary AA amyloidosis is most likely given the background of rheumatoid arthritis (the second most common cause after juvenile idiopathic arthritis in the UK), heavy proteinuria, and positive Congo red staining.

Diabetes would be a possibility, however, it is not associated with a positive Congo red staining. AL amyloidosis tends to be associated with an underlying haematological condition as opposed to an inflammatory problem. Again, Waldenstrom macroglobulinaemia and systemic lupus erythematosus would not cause a positive Congo red staining.

Dr Assem

A 54-year-old woman with a history membranous glomerulonephritis secondary to systemic lupus erythematosus is admitted to hospital. Her previous stable renal function has deteriorated rapidly. On examination she has tenderness in the left flank. The following blood tests were obtained:

Na ⁺	139 mmol/l
K ⁺	5.8 mmol/l
Urea	24 mmol/l
Creatinine	467 μmol/l
Albumin	17 g/l
ESR	49 mm/hr
Urinary protein	14 g/24 hours
Urine dipstick	protein +++ blood ++

What has likely caused the sudden deterioration in renal function?

- ☐ Exacerbation of SLE
- ☐ Renal vein thrombosis
- ☐ Bilateral hydronephrosis
- ☐ Acute interstitial nephritis
- ☐ Analgesic nephropathy

Exacerbation of SLE

16%

Renal vein thrombosis

49%

Bilateral hydronephrosis

5%

Acute interstitial nephritis

22%

Analgesic nephropathy

6%

Nephrotic syndrome predisposes to thrombotic episodes, possibly due to loss of antithrombin III. These commonly occur in the renal veins and may be bilateral. Membranous glomerulonephritis is the most common glomerulonephropathy linked to renal vein thrombosis.

This patient had a number of common features seen in renal vein thrombosis, including loin pain and haematuria.

A greater rise in the ESR would be expected if the renal failure was due to an exacerbation of SLE.

Why do patients with chronic kidney disease have a raised phosphate level?

- ☐ Decreased renal excretion
- ☐ Increased gut absorption
- ☐ Hypervitaminosis D
- ☐ Primary hyperparathyroidism
- ☐ Decreased 25-alpha hydroxylation of vitamin D

Decreased renal excretion

54%

Increased gut absorption

5%

Hypervitaminosis D

4%

Primary hyperparathyroidism

7%

Decreased 25-alpha hydroxylation of vitamin D

30%

A 50-year-old Caucasian man was seen in general practise for review of his hypertension. As the patient was leaving he describes the following lower urinary tract symptoms: urinary frequency, hesitancy, nocturia, post micturition dribbling and poor stream. The general practitioner reviewed the patient two weeks later to find a vast improvement in symptoms. On examination the patients prostate was enlarged, firm, smooth, with a midline sulcus and no craggy elements.

What anti-hypertensive is the general practitioner likely to have started?

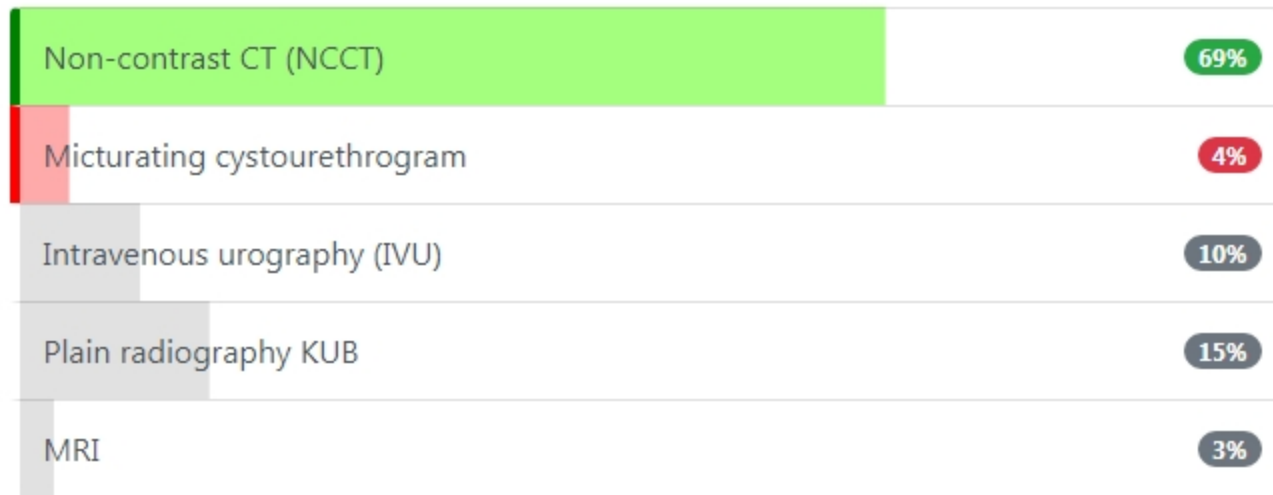
- ☐ Amlodipine
- ☐ Doxazosin
- ☐ Spironolactone
- ☐ Indapamide
- ☐ Ramipril

Amlodipine	5%
Doxazosin	82%
Spironolactone	4%
Indapamide	4%
Ramipril	5%

The patient is describing obstructive prostatic symptoms secondary to likely benign prostatic hyperplasia (BPH). Doxazosin is an alpha-1 blocker commonly used to treat both hypertension and BPH.

A 33-year-old is admitted to the Emergency Department with suspected renal colic. He has a ultrasound that shows a probable stone in the left ureter. What is the most appropriate next step with respect to imaging?

- ☐ Non-contrast CT (NCCT)
- ☐ Micturating cystourethrogram
- ☐ Intravenous urography (IVU)
- ☐ Plain radiography KUB
- ☐ MRI



The 2015 BAUS guidelines state:

Following initial US assessment, NCCT should be used to confirm stone diagnosis in patients with acute flank pain, because it is superior to IVU.

A patient is started on finasteride for the treatment of benign prostatic hyperplasia. How long should the patient be told that treatment may take to be effective?

- ☐ Within 8 hours of taking the tablet
- ☐ Within 3 days
- ☐ Up to 7 days
- ☐ Up to 4 weeks
- ☐ Up to 6 months



Finasteride treatment of BPH may take 6 months before results are seen

Important for me

Less important

A 17-year-old man is referred to the local nephrology unit for investigation. He reports having several episodes of visible haematuria. There is no history of abdominal or loin pain. These typically seem to occur within a day or two of developing an upper respiratory tract infection. Urine dipstick is normal. Blood tests show the following:

Na ⁺	141 mmol/l
K ⁺	4.3 mmol/l
Bicarbonate	25 mmol/l
Urea	4.1 mmol/l
Creatinine	72 µmol/l

What is the most likely diagnosis?

- ☐ Chlamydia
- ☐ Bladder cancer
- ☐ IgA nephropathy
- ☐ Rhinovirus-associated nephropathy
- ☐ Post-streptococcal glomerulonephritis

Chlamydia

3%

Bladder cancer

2%

IgA nephropathy

76%

Rhinovirus-associated nephropathy

4%

Post-streptococcal glomerulonephritis

15%

Which one of the following is not a risk factor for the development of bladder cancer?

- ☐ Occupational exposure to aniline dyes
- ☐ Cyclophosphamide
- ☐ Strongyloides infection
- ☐ Smoking
- ☐ Occupational history involving rubber manufacture



Schistosomiasis rather than Strongyloides infection is associated with an increased risk of bladder cancer

A 24-year-old man presents to his GP with facial swelling. Urine dip notes protein +++ and his blood pressure is 124/68mmHg. He was treated with corticosteroids for possible minimal change disease, but this had no effect.

He consequently was referred for renal biopsy which showed a spike and dome appearance on electron microscopy. Which of these antibodies is most associated with this condition?

- ☐ Anti-cardiolipin
- ☐ Anti-GBM
- ☐ Anti-GAD
- ☐ Anti-phospholipase A2
- ☐ Anti-streptolysin O

Anti-cardiolipin	9%
Anti-GBM	39%
Anti-GAD	10%
Anti-phospholipase A2	26%
Anti-streptolysin O	16%

Idiopathic membranous glomerulonephritis is related to anti-phospholipase A2 antibodies

Important for me [Less important](#)

Firstly, it is important to determine whether this is a nephrotic or nephritic picture. The proteinuria, oedema and normotension all point towards the nephrotic syndrome. Of the causes of nephrotic syndrome in a young adult, minimal change disease (MCD) and membranous glomerulonephritis (MGN) are of the most common. MCD often remits after corticosteroids, whereas MGN classically requires multiple therapies (chlorambucil and ACE-inhibitors are often required). Irrespective of this point, the histology confirms membranous glomerulonephritis.

Anti-phospholipase A2 antibodies are implicated in most idiopathic cases of MGN. The remaining antibodies are associated with antiphospholipid syndrome, Goodpasture's Disease, Type 1 Diabetes and *Streptococcus pyogenes* infection, respectively. These produce different histological pictures.

A 62-year-old man with chronic kidney disease secondary to diabetes mellitus is reviewed. When assessing his estimated glomerular filtration rate (eGFR), which one of the following variables is not required by the Modification of Diet in Renal Disease (MDRD) equation?

- ☐ Age
- ☐ Serum creatinine
- ☐ Ethnicity
- ☐ Gender
- ☐ Serum urea



eGFR variables - CAGE - **C**reatinine, **A**ge, **G**ender, **E**thnicity

Important for me Less important

A patient with sepsis is being treated in hospital. Initially, two 500ml boluses of 0.9% sodium chloride are required to raise his systolic blood pressure (BP) above 90mmHg. Once the BP is in range the foundation doctor prescribes sodium chloride 0.9% maintenance fluids at 1L every 8 hours.

Which of the following complications is most likely to occur as a result of the choice of fluid administered to this patient?

- ☐ Central pontine myelinolysis
- ☐ Hyperchloraemic metabolic acidosis
- ☐ Hyperkalaemia
- ☐ Hypochloraemic hypokalaemic metabolic alkalosis
- ☐ Lactic acidosis

Central pontine myelinolysis	25%
Hyperchloraemic metabolic acidosis	50%
Hyperkalaemia	3%
Hypochloraemic hypokalaemic metabolic alkalosis	18%
Lactic acidosis	4%

Use of 0.9% Sodium Chloride for fluid therapy in patients requiring large volumes = risk of hyperchloraemic metabolic acidosis

Important for me Less important

This patient has received 0.9% sodium chloride. Hyperchloraemic metabolic acidosis is a known iatrogenic complication of using 0.9% sodium chloride in large volumes. In the event of hyperchloraemia or acidaemia, monitor chloride levels daily. If resuscitation is required Hartmanns can be used instead. If the patient now only requires maintenance fluids NICE recommends considering 25–30 ml/kg/day sodium chloride 0.18% in 4% glucose (with potassium supplement as required). See compositions of commonly used crystalloids for further information:

<https://www.nice.org.uk/guidance/cg174/resources/composition-of-commonly-used-crystalloids-table-191662813>

Central pontine myelinolysis is a complication of correcting hyponatraemia too rapidly which does not apply to this scenario.

Hyperkalaemia is not a complication of sodium chloride as it contains no potassium.

Hypochloraemic hypokalaemic metabolic alkalosis is commonly seen in children with pyloric stenosis. It is not associated with 0.9% sodium chloride use.

Lactic acidosis It is not associated with 0.9% sodium chloride. A drug classically associated with lactic acidosis is metformin.

A 38-year-old male is concerned as he has been passing very small amounts of concentrated urine over the past few days despite drinking litres of water. He has just finished a course of antibiotics for tonsillitis and is feeling generally well in himself. He is apyrexial and has a blood pressure of 150/100mmHg. Previous blood pressure readings and kidney function tests have been normal.

Urine dipstick- protein 1+, blood 3+, nitrites negative.

What is the most likely diagnosis?

- ☐ Renovascular disease
- ☐ Interstitial nephritis
- ☐ Acute tubular necrosis
- ☐ Nephrotic syndrome
- ☐ Nephritic syndrome

Renovascular disease	3%
Interstitial nephritis	23%
Acute tubular necrosis	16%
Nephrotic syndrome	5%
Nephritic syndrome	53%

This male has a type of nephritic syndrome. This is indicated by the proteinuria, haematuria, oliguria and hypertension. The recent history of tonsillitis makes post-streptococcal glomerulonephritis the most likely cause.

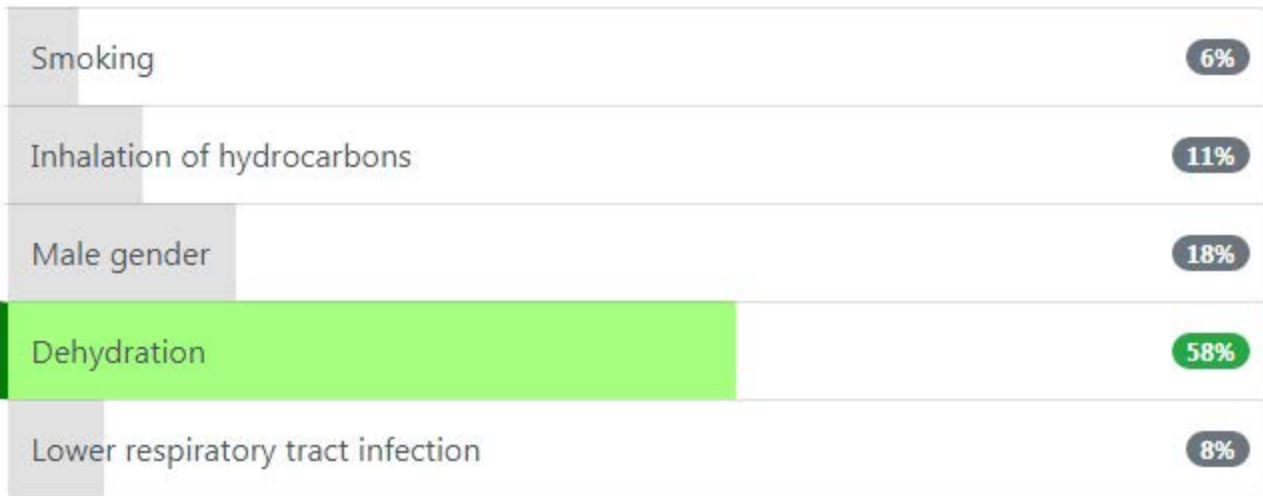
Renovascular disease in young people is most likely to be due to fibromuscular dysplasia of the renal arteries. This presents gradually with hypertension that is resistant to treatment and a declining renal function. This diagnosis is unlikely as the patients' symptoms are acute and previous blood pressure and renal function tests have been normal.

Interstitial nephritis and acute tubular necrosis are usually caused by nephrotoxic drugs or an infection. They usually present with acute renal failure. The history above states the patient has had an infection and has taken antibiotics recently, therefore, these answers could be correct. However, nephritic syndrome is more likely given the results of the urine dipstick.

Nephrotic syndrome is unlikely. It usually presents with the triad of proteinuria, oedema and hypoalbuminaemia.

A 27-year-old man is diagnosed with Goodpasture's syndrome. Which one of the following does not increase the likelihood of a pulmonary haemorrhage?

- ☐ Smoking
- ☐ Inhalation of hydrocarbons
- ☐ Male gender
- ☐ Dehydration
- ☐ Lower respiratory tract infection



Risk Factor	Percentage
Smoking	6%
Inhalation of hydrocarbons	11%
Male gender	18%
Dehydration	58%
Lower respiratory tract infection	8%

6%

Inhalation of hydrocarbons

11%

Male gender

18%

Dehydration

58%

Lower respiratory tract infection

8%

Dehydration may decrease the likelihood of a pulmonary haemorrhage. Pulmonary oedema is associated with an increased risk

Which one of the following factors is most likely to invalidate the use of the Modification of Diet in Renal Disease (MDRD) equation to calculate a patient's eGFR?

- ☐ Diuretic use
- ☐ Pregnancy
- ☐ Type 2 diabetes mellitus
- ☐ Blood pressure of 180/110 mmHg
- ☐ Female gender

Diuretic use

14%

Pregnancy

65%

Type 2 diabetes mellitus

6%

Blood pressure of 180/110 mmHg

4%

Female gender

11%

GFR tends to increase during pregnancy although the eGFR may not reflect this.

Dr Assem

A 34-year-old man is investigated for recurrent renal stones. He has been hospitalised on multiple occasions and has required lithotripsy three times. Investigations show the following:

Calcium	2.08 mmol/l
Phosphate	0.85 mmol/l
Parathyroid hormone	4.1 pmol/L (normal range = 0.8 - 8.5)

24 hour urinary calcium	521 mg/24 hours (normal range < 300)
-------------------------	--------------------------------------

Which one of the following treatments is most likely to reduce the incidence of renal stones?

- ☐ Pyridoxine
- ☐ Bicarbonate supplements
- ☐ Bisphosphonates
- ☐ Parathyroidectomy
- ☐ Indapamide



The fact that thiazide diuretics cause hypercalcaemia is sometimes confused with their role in preventing calcium renal stones - the hypercalcaemia seen is secondary to increased distal tubular calcium resorption and hence lower calcium concentration in the urine.

There are some studies currently looking at the role of bisphosphonates in hypercalciuria but their long-term benefit is not yet established and thiazides remain the first-line treatment.

A patient is seen in clinic complaining of abdominal pain. Routine bloods show:

Na ⁺	142 mmol/l
K ⁺	4.0 mmol/l
Chloride	104 mmol/l
Bicarbonate	19 mmol/l
Urea	7.0 mmol/l
Creatinine	112 μ mol/l

What is the anion gap?

☐ 4 mmol/L

☐ 14 mmol/L

☐ 20 mmol/L

☐ 21 mmol/L

☐ 23 mmol/L



The anion gap may be calculated by using (sodium + potassium) - (bicarbonate + chloride)

$$= (142 + 4.0) - (104 + 19) = 23 \text{ mmol/L}$$

A 71-year-old man with chronic kidney disease stage 3 is reviewed in the cardiology clinic. He is known to have hypertension and ischaemic heart disease but a recent fasting glucose result confirmed he is not diabetic. A recent early morning urine result is reported as follows:

	1 week ago	6 months ago
Na ⁺	141 mmol/l	140 mmol/l
K ⁺	4.1 mmol/l	4.3 mmol/l
Urea	7.2 mmol/l	6.3 mmol/l
Creatinine	98 µmol/l	99 µmol/l

	1 week ago	6 months ago
Albumin:creatinine ratio	15.2 mg/mmol	2.6 mg/mmol

What is the most appropriate action?

- ☐ Refer to a nephrologist
- ☐ Repeat the sample
- ☐ Obtain a 24-hour urine collection
- ☐ Repeat using a late-evening sample
- ☐ Arrange renovascular imaging

Dr Assem

Refer to a nephrologist

21%

Repeat the sample

34%

Obtain a 24-hour urine collection

30%

Repeat using a late-evening sample

4%

Arrange renovascular imaging

11%

NICE recommend 'if the initial ACR is between 3 mg/mmol and 70 mg/mmol, this should be confirmed by a subsequent early morning sample. If the initial ACR is 70 mg/mmol or more, a repeat sample need not be tested.'

Which one of the following is associated with a better prognosis in patients with IgA nephropathy?

- ☐ Heavy proteinuria at presentation
- ☐ Male gender
- ☐ Hyperlipidaemia
- ☐ Frank haematuria
- ☐ ACE genotype DD

Heavy proteinuria at presentation

6%

Male gender

11%

Hyperlipidaemia

3%

Frank haematuria

67%

ACE genotype DD

12%

A 44-year-old man is referred to the renal team. He has a long history of chronic sinusitis and was investigated last year for haemoptysis but no cause was found. A number of recent urine dipstick tests has shown persistent microscopic haematuria.

Na ⁺	140 mmol/l
K ⁺	4.8 mmol/l
Urea	11.4 mmol/l
Creatinine	145 µmol/l

ESR	61 mm/hr
CRP	30 mg/l
anti-GBM	Negative
cANCA (PR3)	Positive
pANCA (MPO)	Negative
ANA	Negative

Given the likely diagnosis, what findings would be expected on renal biopsy?

- ☐ Segmental tuft necrosis
- ☐ Kimmelstiel-Wilson nodules
- ☐ Crescentic glomerulonephritis
- ☐ 'Full-house' immunoglobulin deposition
- ☐ Membranous glomerulonephritis

Segmental tuft necrosis

5%

Kimmelstiel-Wilson nodules

8%

Crescentic glomerulonephritis

66%

'Full-house' immunoglobulin deposition

8%

Membranous glomerulonephritis

13%

A 45-year-old man had presented with complaints of weight loss, chest pain, dry cough and breathlessness. Blood tests revealed raised white cell count (WCC) and also revealed an elevated lactate dehydrogenase (LDH) levels. A plain radiograph of the chest shows multiple suspicious lesions suggestive of metastases to the lung. A subsequent CT scan of the chest showed the presence of a large anterior mediastinum irregular mass.

What is the likely diagnosis?

- ☐ Extra-pulmonary tuberculosis
- ☐ Cryptogenic organising pneumonia
- ☐ Mediastinal germ cell tumour with lung metastases
- ☐ Staphylococcal abscesses
- ☐ Renal cell carcinoma with lung metastases

Extra-pulmonary tuberculosis	9%
Cryptogenic organising pneumonia	10%
Mediastinal germ cell tumour with lung metastases	50%
Staphylococcal abscesses	8%
Renal cell carcinoma with lung metastases	22%

The mediastinum is the most common site of extragonadal germ cell tumour (EGGCT)

Important for me Less important

The mediastinum is the most common site of extragonadal germ cell tumour (EGGCT). Mediastinal EGGCT will often present with chest pain, cough, dyspnoea, fever, weight loss and anorexia. The most common site within the actual mediastinum is the anterosuperior compartment where they grow quickly, metastasising early.

Extrapulmonary tuberculosis is tuberculosis (TB) in another part of the body other than the lungs. This occurs more commonly in immunosuppressed individuals and younger children. Spread to lymph nodes is frequent. Other sites of spread involve the central nervous system, pleura, bones & joints.

Cryptogenic organising pneumonia (COP) smaller airway swelling within the lungs, often referred to as bronchiolitis obliterans organising pneumonia. It does encompass symptoms that can do follow closely to a pneumonia infection with fever, fatigue, coughing and shortness of breath.

Renal cell carcinoma (RCC) classically presents as a triad of flank pain, haematuria and a palpable abdominal mass.

Staphylococcal abscesses are unlikely in this situation given the lack of fever or swinging pyrexia despite the presence of a raised white cell count (WCC).

Each one of the following is a cause of nephrogenic diabetes insipidus, except:

- ☐ Hypercalcaemia
- ☐ Demeclocycline
- ☐ Histiocytosis X
- ☐ Lithium
- ☐ Hypokalaemia

Hypercalcaemia

7%

Demeclocycline

7%

Histiocytosis X

68%

Lithium

6%

Hypokalaemia

11%

A 45-year-old who has developed chronic kidney disease secondary to focal segmental glomerulosclerosis is reviewed in the renal clinic. His renal function is deteriorating and the eGFR is currently 15 mL/min/1.73 m². The nephrologist is planning for haemodialysis. What is the preferred method of access for haemodialysis?

- ☐ Arteriovenous fistula
- ☐ Tunelled venous catheter
- ☐ Non-tunelled venous catheter
- ☐ Arteriovenous graft
- ☐ Peritoneal catheter

Arteriovenous fistula

76%

Tunelled venous catheter

8%

Non-tunelled venous catheter

3%

Arteriovenous graft

6%

Peritoneal catheter

6%

Arteriovenous fistulas are the preferred method of access for haemodialysis

Important for me Less important

A 38-year-old woman is referred by the general practitioner as her recent blood test showed elevated creatinine and urea levels. Other blood test results are normal. She is oliguric but could produce enough sample for urine dip. Her urine is negative for red cells, nitrites and leucocytes. She was recently started on Ramipril for hypertension 3 weeks ago.

She is otherwise well. Her observations are within normal limits. The renal ultrasound shows two normal-sized kidneys with an unobstructed urinary system. Duplex ultrasound showed stenotic renal arteries. Subsequent MR angiography confirmed the diagnosis with the finding of 'string of beads' appearance of the renal arteries.

What is the most likely cause of this presentation?

- ☐ Glomerulonephritis
- ☐ Pyelonephritis
- ☐ Fibromuscular dysplasia
- ☐ Nephrotic syndrome
- ☐ Nephrolithiasis

Submit answer

Glomerulonephritis	8%
Pyelonephritis	8%
Fibromuscular dysplasia	62%
Nephrotic syndrome	12%
Nephrolithiasis	10%

Consider fibromuscular dysplasia in young female patients who develop AKI after the initiation of an ACE inhibitor

Important for me [Less important](#)

In young female patients who develop AKI after initiation of an ACE inhibitor, fibromuscular dysplasia should be suspected. In older persons, suspect atherosclerosis of renal arteries.

Fibromuscular dysplasia describes the proliferation of cells in the walls of the arteries causing the vessels to bulge or narrow. This most commonly affects women. These patients are susceptible to AKI after the initiation of an ACE inhibitor. The classic description is 'string of beads' appearance.

The normal urine dip results ruled out glomerulonephritis and nephrotic syndrome as the cause of kidney failure. Glomerulonephritis typically presents with haematuria with the presence of red cell casts. Nephrotic syndrome presents with heavy proteinuria, oedema and hypoalbuminaemia.

Nephrolithiasis typically presents with painful loin-to-groin pain. It does not cause acute kidney injury unless both kidneys are affected. This was ruled out by the renal ultrasound.



 Discuss

Improve

Fibromuscular dysplasia

Renal artery stenosis secondary to atherosclerosis accounts for around 90% of renal vascular disease, with fibromuscular dysplasia being the most common cause of the remaining 10%.

Epidemiology

- 90% of patients are female

Features

- hypertension
- chronic kidney disease or more acute renal failure e.g. secondary to ACE-inhibitor initiation
- 'flash' pulmonary oedema

A 23-year-old man presents with recurrent headaches. These typically occur 2 or 3 times a month and are characterised by severe, right-sided headaches which are throbbing in nature and last around 8-12 hours. When he gets the headaches he finds it hard to carry on working and tends to go and lie down in a dark room. The headaches so far have responded poorly to paracetamol.

Which one of the following medications should be prescribed to help reduce the frequency of these headaches?

- ☐ Ibuprofen
- ☐ Pizotifen
- ☐ Propranolol
- ☐ Amitriptyline
- ☐ Carbamazepine

Ibuprofen

5%

Pizotifen

8%

Propranolol

72%

Amitriptyline

9%

Carbamazepine

5%

Migraine

- acute: triptan + NSAID or triptan + paracetamol
- prophylaxis: topiramate or propranolol

Important for me Less important

This is a classic history of migraine, prophylaxis should be offered with propranolol or topiramate.

Dr Assem

A 34-year-old man has been brought in by his wife following a mechanical fall from standing in which he hit his head and lost consciousness for around 10 seconds. He has full memory of the events leading up to the fall, but no memory of the 30 minutes following the fall. He has not vomited but complains of a headache. He has no past medical history of note.

On examination, he has a small laceration above his left eye but no evidence of a basal skull fracture. He scores 15 on the Glasgow coma scale and there is no neurological deficit.

What is the most appropriate management?

- ☐ Arrange a CT head scan within 1 hour of presentation
- ☐ Arrange a CT head scan within 8 hours of presentation
- ☐ Discharge with head injury advice and advise his wife to observe him for the next 24 hours
- ☐ Keep him in for observation for at least 8 hours
- ☐ Keep him in for observation for at least 24 hours

Arrange a CT head scan within 1 hour of presentation

30%

Arrange a CT head scan within 8 hours of presentation

24%

Discharge with head injury advice and advise his wife to observe him for the next 24 hours

23%

Keep him in for observation for at least 8 hours

12%

Keep him in for observation for at least 24 hours

11%

Over 30 minutes retrograde amnesia is an indication for a CT scan following a head injury, not anterograde amnesia

Important for me Less important

NICE have published guidance on the need for CT imaging following a head injury. The question does not mention any of the criteria that would warrant an immediate CT scan of his head. This man also does not fulfil the criteria for a CT head within 8 hours due to his age, no past medical history and relatively benign mechanism of injury. He does describe some anterograde amnesia, but he would require at least 30 minutes retrograde amnesia immediately prior to the injury to warrant a CT head scan.

This man will require monitoring to look for concerning features that may develop, but if he is living with his wife it is reasonable for this to be done at home. Therefore, there is no indication to admit him for observation.

Lateral medullary syndrome is caused by occlusion of which one of the following blood vessels?

- ☐ Anterior inferior cerebellar artery
- ☐ Posterior cerebral artery
- ☐ Lateral sinus thrombosis
- ☐ Middle cerebral artery
- ☐ Posterior inferior cerebellar artery

Anterior inferior cerebellar artery

10%

Posterior cerebral artery

6%

Lateral sinus thrombosis

5%

Middle cerebral artery

6%

Posterior inferior cerebellar artery

73%

Lateral medullary syndrome - PICA lesion - cerebellar signs, contralateral sensory loss & ipsilateral Horner's

Important for me Less important

A 53-year-old woman presented with a sudden onset left-sided arm and leg weakness. She has a background of atrial fibrillation, for which she is anti-coagulated with warfarin, and suffers from Alzheimer's dementia, for which she takes donepezil. She lives on her own in a ground floor flat with carers helping with her activities of daily living twice daily. Her family live fairly close by. Recently she lost her husband who died from metastatic lung cancer. She reports having forgotten to take her medications on several occasions.

On examination, she did not have any slurred speech but there was a right facial droop. A reduction in power was noted in her left arm and leg. Her left plantar response was up-going.

What is the first line investigation to further evaluate her symptoms?

☐ Non-contrast MRI Brain

☐ T2-weighted-fluid-attenuated inversion recovery (FLAIR) MRI Brain

☐ Contrast CT Head

☐ Non-contrast CT Head

☐ Diffusion-weighted MRI Brain

Non-contrast MRI Brain	9%
T2-weighted-fluid-attenuated inversion recovery (FLAIR) MRI Brain	11%
Contrast CT Head	17%
Non-contrast CT Head	54%
Diffusion-weighted MRI Brain	10%

Non-contrast CT head scan is the first line radiological investigation for suspected stroke

Important for me Less important

This patient is presenting with symptoms and signs highly suggestive of an acute cerebrovascular event. The first line investigation in these situations is to perform a non-contrast CT head scan to rule out a haemorrhagic event. Given the patient's background of atrial fibrillation, the patient is at a higher risk of such events.

Diffusion-weighted MRI brain scans are generally done later to further investigate the early changes after a stroke event and diagnose vascular strokes by highlighting the early presence of hypoxic oedematous changes.

Using a contrast medium with CT head scans in the acute phase of stroke has not generally been useful. Contrast CT head scans are more useful for detecting cerebral metastases and abscesses.

Using fluid-attenuated inversion recovery (FLAIR) MRI imaging can aid in estimating an onset of acute ischaemic stroke within six hours enabling more patients to receive thrombolytic therapy, especially when the history of onset remains unclear. T2-weighted imaging is more sensitive than T1-weighted imaging in detecting ischemic changes.

A 64-year-old man presents with a eight-month history of generalised weakness. On examination he has fasciculation and weakness in both arms with absent reflexes. Examination of the lower limbs reveal increased tone and exaggerated reflexes. Sensation was normal and there were no cerebellar signs. What is the most likely diagnosis?

☐ Progressive muscular atrophy

☐ Amyotrophic lateral sclerosis

☐ Vitamin B12 deficiency

☐ Syringomyelia

☐ Multiple sclerosis

Progressive muscular atrophy

8%

Amyotrophic lateral sclerosis

69%

Vitamin B12 deficiency

6%

Syringomyelia

12%

Multiple sclerosis

5%

'Fasciculations' - think motor neuron disease

Important for me Less important

These symptoms are typical of amyotrophic lateral sclerosis, the most common type of motor neuron disease.

A 34-year-old female presents with vomiting preceded by an occipital headache of acute onset. On examination she was conscious and alert with photophobia but no neck stiffness. CT brain is reported as normal. What is the most appropriate further management?

- ☐ CT brain with contrast
- ☐ Repeat CT brain in 24h
- ☐ CSF examination
- ☐ Cerebral angiography
- ☐ MRI brain

CT brain with contrast	6%
Repeat CT brain in 24h	7%
CSF examination	67%
Cerebral angiography	8%
MRI brain	12%

If subarachnoid haemorrhage is suspected but the CT head is normal, a lumbar puncture is required to confirm or exclude this diagnosis

Important for me Less Important

If the CSF examination revealed xanthochromia, or there was still a high level of clinical suspicion, then cerebral angiography would be the next step.



Which one of the following side-effects is not recognised in patients taking sodium valproate?

☐ Alopecia

☐ Weight gain

☐ Hepatitis

☐ Induction P450 system

☐ Teratogenicity

A 54-year-old female with known breast cancer develops progressive motor disorder with impairment of right arm function. She is clumsy with all movements and exaggerated 'flinging' actions are noted on examination. There is a similar pattern in the right leg with to a much lesser extent. There are no other abnormalities on neurological examination.

Where is the lesion most likely to be?

- ☐ Caudate nucleus
- ☐ Lateral cerebellum
- ☐ Pre-motor cortex
- ☐ Sub-thalamic nucleus
- ☐ Temporal lobe



This is the clinical presentation of hemiballismus. Hemiballismus is a movement disorder characterised by very violent movements of the arm or limbs. People can seriously injure themselves. Caused by a stroke or other lesion of the subthalamic nucleus.

Movement disorders in order of least speed to fastest (DACB)

- Dystonia - fixated position
- Athetosis - Snake-like writhing (slow)
- Choreiform - Like a dance choreographer
- Ballistic/Ballismus/Hemiballismus - Fast flinging movements, can injure themselves or others 'like a ballistic missile' (memorisation method)

Dr Assem

A 30-year-old lady presents with acute occipital headache associated with vomiting, photophobia and stiff neck. There is no history of rash or fever. She has a past medical history of pheochromocytoma for which she had surgery. She reports that her father died of kidney cancer and her brother is blind in his right eye due to a bleed in the eye.

What is the unifying diagnosis?

- ☐ Polycystic kidney disease
- ☐ Von Hippel Lindau disease
- ☐ Multiple endocrine neoplasia type 1
- ☐ Tuberous sclerosis
- ☐ Alport syndrome

Polycystic kidney disease

15%

Von Hippel Lindau disease

55%

Multiple endocrine neoplasia type 1

14%

Tuberous sclerosis

11%

Alport syndrome

5%

This patient has von Hippel Lindau disease which is characterised by retinal and cerebellar haemangiomas, renal cysts with transformation to renal cell carcinoma, and pheochromocytoma. Neurological signs can be due to compression by haemangiomas, or an acute headache due to intracerebral or subarachnoid haemorrhage as in this patient.

Explanation for other options:

- 1. Polycystic kidney disease is associated with subarachnoid haemorrhage due to berry aneurysms, but the other pointers in the history of a pheochromocytoma and a family history of retinal bleeding and renal cell carcinoma do not fit with PKD.
- 3. Multiple endocrine neoplasia type 1 is associated with parathyroid disease, pancreatic endocrine tumours and pituitary tumours.
- 4. Tuberous sclerosis is associated with hamartomas of the brain, eye and kidneys but would have characteristic skin signs present such as angiofibroma, shagreen patches and adenoma sebaceum.
- 5. Alport syndrome is not associated with intracerebral bleeding.

A 33-year-old Indian man presented with a 5-day history of fevers, vomiting and dizziness. He had recently come back from a trip to Kerala and had been treated with a two-week course of clarithromycin for a bout of prolonged severe sinusitis by his GP. This was due to the fact that he had been suffering from severe frontal headaches, difficulty sleeping and periorbital swelling. He has a background of tuberculosis (TB) and is currently on treatment with rifampicin and isoniazid.

On examination, there was some slurring dysarthria and mild coarse nystagmus to the left. His observation shows a temperature of 38.3°C, pulse 93 beats per minute, blood pressure 120/80mmHg and oxygen saturation 93% on room air.

What is the most likely diagnosis?

- ☐ TB meningitis
- ☐ Cerebellar metastases
- ☐ Cerebellar haemorrhage
- ☐ Cerebellar abscess
- ☐ Chronic sinusitis

TB meningitis	22%
Cerebellar metastases	7%
Cerebellar haemorrhage	8%
Cerebellar abscess	56%
Chronic sinusitis	8%

Cerebellar abscesses are most commonly caused by otogenic diseases like mastoiditis and sinusitis infections

Important for me Less important

Brain abscesses are focal areas of intracerebral pus collection which occur due to a number of causes. In particular, cerebellar abscesses most commonly occur due to infections such as mastoiditis and sinusitis infections.

Cerebellar haemorrhage is a more acute vascular event which would have a quicker onset and likely present with stronger neurological signs with sudden onset headache, dizziness, vomiting, vertigo, truncal ataxia and impairment of consciousness.

Chronic sinusitis is referred to when the cavities around nasal passages - known as sinuses - remain inflamed and swollen for at least 12 weeks, in spite of various treatment attempts.

TB meningitis would present with fever and chills, neck stiffness, photophobia associated with mental changes.

Cerebellar metastases would present with headaches (the most common symptom of brain metastases), nausea, vomiting, difficulty walking, seizures with speech disturbance.

A 55-year-old man is referred to the neurology clinic due to a resting tremor and an abnormal gait characterised by short, shuffling steps. Which one of the following features would point towards a diagnosis of Parkinson's disease rather than parkinsonism of another cause?

- ☐ Asymmetrical tremor
- ☐ Bradykinesia
- ☐ Impairment of vertical gaze
- ☐ Confusion
- ☐ Poor response to levodopa therapy

Asymmetrical tremor

48%

Bradykinesia

35%

Impairment of vertical gaze

7%

Confusion

3%

Poor response to levodopa therapy

6%

Asymmetrical symptoms suggests idiopathic Parkinson's

Important for me Less important

A man is recovering after having an operation to remove a meningioma in his left temporal lobe. What sort of visual field defect is he at risk of having following the procedure?

- ☐ Right inferior homonymous quadrantanopia
- ☐ Right superior homonymous quadrantanopia
- ☐ Left inferior homonymous quadrantanopia
- ☐ Right homonymous hemianopia with macula sparing
- ☐ Left superior homonymous quadrantanopia

Right inferior homonymous quadrantanopia

11%

Right superior homonymous quadrantanopia

60%

Left inferior homonymous quadrantanopia

7%

Right homonymous hemianopia with macula sparing

10%

Left superior homonymous quadrantanopia

13%

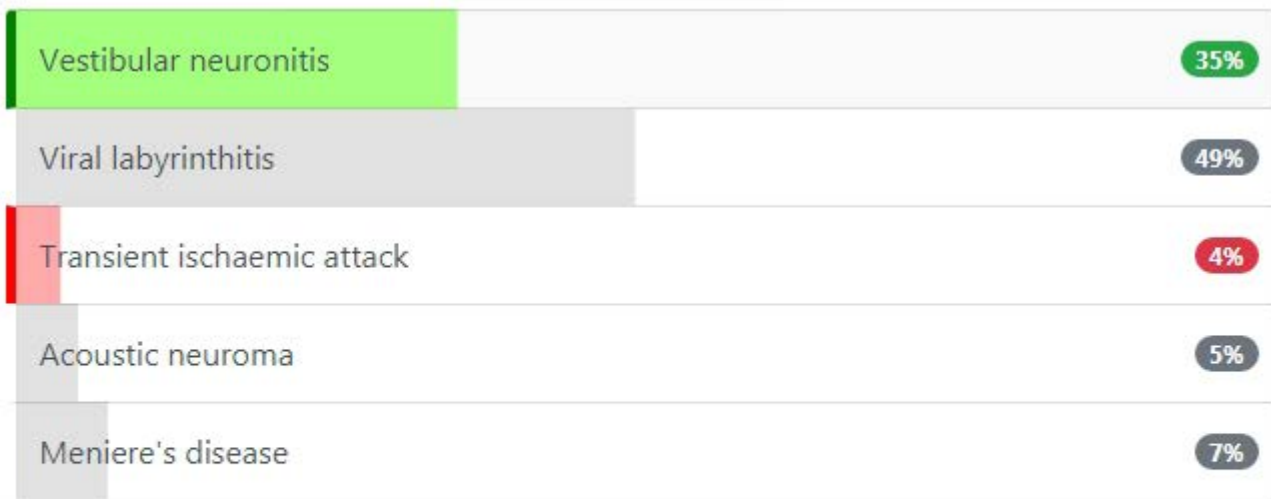
Visual field defects:

- left homonymous hemianopia means visual field defect to the left, i.e. lesion of right optic tract
- homonymous quadrantanopias: PITS (Parietal-Inferior, Temporal-Superior)
- incongruous defects = optic tract lesion; congruous defects = optic radiation lesion or occipital cortex

Important for me Less important

A 40-year-old man presents with a 4-day history of vertigo. This seems to have followed a viral upper respiratory tract infection in the past week. He is generally fit and well. His symptoms are associated with some nausea but there is no hearing loss or tinnitus. On examination fine horizontal nystagmus is noted. What is the most likely diagnosis?

- ☐ Vestibular neuronitis
- ☐ Viral labyrinthitis
- ☐ Transient ischaemic attack
- ☐ Acoustic neuroma
- ☐ Meniere's disease

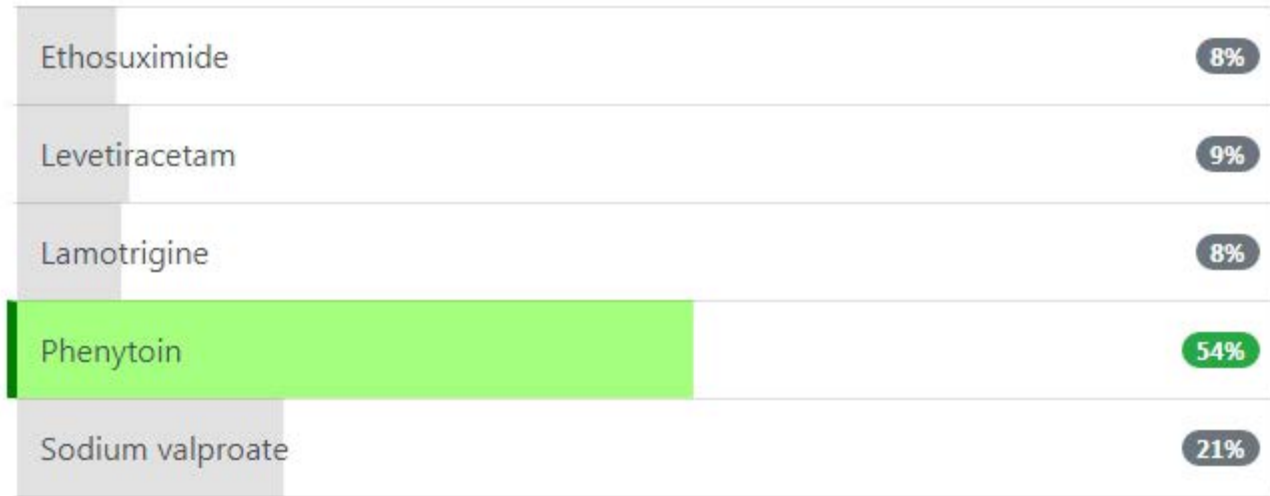


The absence of hearing loss suggests a diagnosis of vestibular neuronitis rather than viral labyrinthitis.

A 57-year-old Polish patient, who just moved to the UK 6 months ago, presents to the emergency department following a fall. You notice that he has a wide-based gait, bilateral hand tremor and a nystagmus.

Which medication is he likely to be taking?

- ☐ Ethosuximide
- ☐ Levetiracetam
- ☐ Lamotrigine
- ☐ Phenytoin
- ☐ Sodium valproate



Phenytoin use is a cause of the cerebellar syndrome

Important for me Less important

The patient presents with a cerebellar syndrome. Phenytoin use is a cause of the cerebellar syndrome.

The other medications are less likely to cause the cerebellar syndrome.

You want to prescribe an antiemetic to a 19-year-old female who is having a migraine attack. Which one of the following medications is most likely to precipitate extrapyramidal side-effects?

- ☐ Meptazinol
- ☐ Ondansetron
- ☐ Domperidone
- ☐ Cyclizine
- ☐ Metoclopramide



Extrapyramidal side-effects are particularly common in children and young adults.

Acetazolamide	7%
High flow oxygen	71%
Paracetamol and naproxen	10%
Urgent CT head	5%
Verapamil	7%

This patient presents with a cluster headache. Cluster headaches are so named as clusters of headaches occur frequently over a period of weeks followed by pain free periods of months to years.

The clinical features include unilateral headaches almost always affecting the same side, tearing and redness of the affected eye, rhinorrhoea and miosis +/- ptosis.

The pathophysiology of cluster headaches is unclear. They occur more common in men (5:1) and smokers.

Abortive management of cluster headaches involves the use of 100% oxygen at at least 12 litres per minute via a non-rebreathable mask and/or a subcutaneous or nasal triptan.

First line long-term preventative management of cluster headaches is verapamil.

It is not recommended to offer paracetamol, NSAIDS, opioids, ergots or oral triptans for the acute treatment of a cluster headache.

(Source: NICE headache guidelines)

<http://www.nice.org.uk/guidance/cg150/chapter/1-recommendation>

A 36-year-old man presents to the emergency department with a severe left-sided headache with pain around the left eye. He has had several similar episodes over the last 2 weeks, lasting 40-60 minutes each. The headaches are associated with a runny nose. On examination, there is redness and tearing of his left eye.

What is the most appropriate acute management?

- ☐ Acetazolamide
- ☐ High flow oxygen
- ☐ Paracetamol and naproxen
- ☐ Urgent CT head
- ☐ Verapamil

A 24-year-old woman presents for advice. Over the past few months she has been having increasing problems with migraine around the time of menstruation. Her current migraine started around 24 hours ago and has not responded to a combination of paracetamol and aspirin. What is the most appropriate next step to relieve her headache?

- ☐ Codeine
- ☐ Ergotamine
- ☐ Sumatriptan
- ☐ Venlafaxine
- ☐ Norethisterone

Codeine

6%

Ergotamine

8%

Sumatriptan

75%

Venlafaxine

5%

Norethisterone

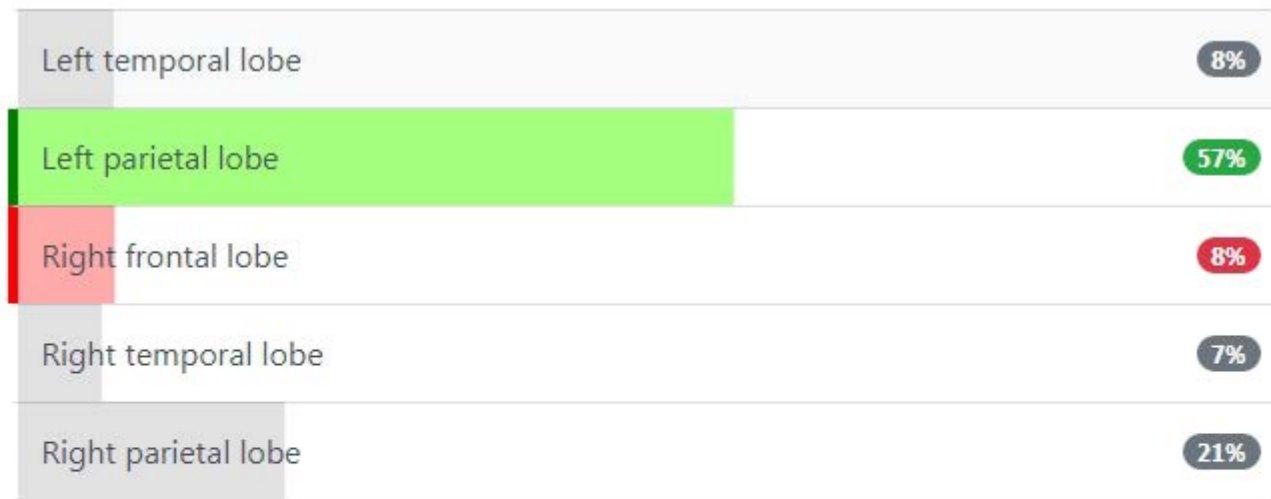
6%

Oral mefenamic acid would also be a suitable alternative.

A 78-year-old right-handed female is admitted with an acute onset stroke of 2 hours duration. The decision was taken by the stroke team for thrombolysis which cures her symptoms. She is subsequently transferred to the high dependency unit for closer monitoring. Overnight, she has three bouts of vomiting and is seen by an FY2 who detects a new onset right-left disorientation and acalculia.

An urgent CT scan is requested which reveals an intracerebral haemorrhage. Which area of the brain is most likely to have been affected?

- ☐ Left temporal lobe
- ☐ Left parietal lobe
- ☐ Right frontal lobe
- ☐ Right temporal lobe
- ☐ Right parietal lobe



This is a case of Gerstmann syndrome. Gerstmann syndrome is a constellation of acalculia, right-left disorientation, finger agnosia and agraphia. This occurs as a result of a deficit in the angular and supramarginal gyri between the dominant parietal and temporal lobes. This can occur with space occupying lesions or in adults following a stroke.

A 25-year-old female with a history of depression presents to her GP with a two day history of numbness affecting the C6 distribution in her right arm. There is no history of neck pain or injury. Neurological examination confirms reduced sensation in that dermatome but is otherwise unremarkable. She reports no similar episodes previously although does describe an episode three months ago of reduced vision and painful movements in her right eye. This resolved spontaneously and she did not seek medical attention. What is the most likely diagnosis?

- ☐ Somatisation disorder
- ☐ Huntington's disease
- ☐ Multiple sclerosis
- ☐ Syringomyelia
- ☐ Conversion disorder



The symptoms three months ago were likely due to optic neuritis, a common presenting feature of multiple sclerosis.

Whilst she has a depression this does not necessarily mean that her symptoms are due to either a conversion or somatisation disorder. Depression is obviously very common and may indeed be one of the subtle manifestations of multiple sclerosis.

Which one of the following features is most associated with temporal lobe lesions?

- ☐ Astereognosis
- ☐ Auditory agnosia
- ☐ Visual agnosia
- ☐ Disinhibition
- ☐ Expressive (Broca's) aphasia

Astereognosis

11%

Auditory agnosia

60%

Visual agnosia

8%

Disinhibition

5%

Expressive (Broca's) aphasia

16%

Temporal lobe lesions may cause auditory agnosia

Important for me

Less important

You are examining a patient who complains of double vision. Whilst looking forward the patient's right eye turns upwards and outwards. On attempting to look to the patient's left the right eye elevates more as it moves medially. On looking right there is no obvious squint. What is the most likely underlying problem?

- ☐ Right 6th nerve palsy
- ☐ Right 4th nerve palsy
- ☐ Right 3rd nerve palsy
- ☐ Left 6th nerve palsy
- ☐ Left 3rd nerve palsy

Right 6th nerve palsy

17%

Right 4th nerve palsy

44%

Right 3rd nerve palsy

21%

Left 6th nerve palsy

9%

Left 3rd nerve palsy

9%

A 69-year-old man who is known to have Alzheimer's disease is reviewed in clinic. His latest Mini Mental State Examination (MMSE) score is 18 out of 30. What is the most appropriate management?

- ☐ Supportive care + memantine
- ☐ Supportive care + trial of citalopram
- ☐ Supportive care
- ☐ Supportive care + donepezil + low-dose aspirin
- ☐ Supportive care + donepezil

Supportive care + memantine

21%

Supportive care + trial of citalopram

3%

Supportive care

8%

Supportive care + donepezil + low-dose aspirin

9%

Supportive care + donepezil

59%

A 65-year-old gentleman is referred to neurology outpatients with arm pain, stiffness and imbalance. Following investigations he is diagnosed with degenerative cervical myelopathy. Unfortunately, he misses his next outpatient clinic due to admission with acute coronary syndrome. He attends his GP 2 months later and mentions his ongoing neurological symptoms. Which of the following is the most important next step in his care?

- ☐ Refer to spinal surgery or neurosurgery
- ☐ Refer for cervical nerve root injections
- ☐ Commence neuropathic analgesia
- ☐ Reassure the patient of his diagnosis
- ☐ Refer for physiotherapy

Refer to spinal surgery or neurosurgery

78%

Refer for cervical nerve root injections

4%

Commence neuropathic analgesia

6%

Reassure the patient of his diagnosis

4%

Refer for physiotherapy

8%

Management of patients with cervical myelopathy should be by specialist spinal services (neurosurgery or orthopaedic spinal surgery). Decompressive surgery is the mainstay of treatment and has been shown to stop disease progression (B, false). Close observation is an option for mild stable disease, but anything progressive or more severe requires surgery to prevent further deterioration. Pre-operative physiotherapy should only be initiated by specialist services, as manipulation can cause more spinal cord damage.

The timing of surgery is important, as any existing spinal cord damage can be permanent. Treatment within 6 months offers the best chance of making a full recovery. At present most patients wait more than 2 years for a diagnosis [1].

Other incorrect options:

- Neuropathic analgesia is important for symptomatic relief but will not prevent further cord damage.
- Physiotherapy does not replace surgical opinion, it can in fact cause more spinal cord damage in patients yet to receive surgical treatment. It should therefore only be initiated by specialist services.

1. Behrbalk E, Salame K, Regev GJ, Keynan O, Boszczyk B, Lidar Z. Delayed diagnosis of cervical spondylotic myelopathy by primary care physicians. *Neurosurg Focus*. 2013 Jul;35(1):E1.

A 65-year old gentleman with a background of osteoarthritis and previous cervical laminectomy for degenerative cervical myelopathy presents with a 2-month history of worsening gait instability and urinary urgency. Which of the following is the most likely explanation for his symptoms?

- ☐ Transverse myelitis
- ☐ Recurrent degenerative cervical myelopathy
- ☐ Multiple sclerosis
- ☐ Cauda equina syndrome
- ☐ Spinal metastases

Transverse myelitis	17%
Recurrent degenerative cervical myelopathy	51%
Multiple sclerosis	5%
Cauda equina syndrome	22%
Spinal metastases	4%

Postoperatively, patients with cervical myelopathy require ongoing follow-up as pathology can 'recur' at adjacent spinal levels, which were not treated by the initial decompressive surgery. This is called adjacent segment disease. Furthermore, surgery can change spinal dynamics increasing the likelihood of other levels being affected. Patients sometimes develop mal-alignment of the spine, including kyphosis and spondylolisthesis, and this can also affect the spinal cord. All patients with recurrent symptoms should be evaluated urgently by specialist spinal services.

Transverse myelitis usually presents more acutely than in this case, with a sensory level and upper motor neuron signs below the level affected. It can occur in patients with multiple sclerosis or Devic's disease (neuromyelitis optica). These patients tend to also have features such as optic neuritis.

Cauda equina syndrome results from compression of the cauda equina and classically includes leg weakness, saddle anaesthesia and sphincter disturbance. This gentleman's history is much more likely to be in keeping with recurrent cervical myelopathy, given his background and given the subacute presentation.

Spinal metastases are uncommon, especially in a patient without a known primary. Given previous DCM, recurrence is more likely.

A 71-year-old man is reviewed following an ischaemic stroke. He is known to be intolerant of clopidogrel. What is the most appropriate therapy to help reduce his chance of having a further stroke?

- ☐ Aspirin + dipyridamole. Stop dipyridamole after 2 years
- ☐ Dipyridamole. Stop dipyridamole after 2 years
- ☐ Aspirin lifelong
- ☐ Warfarin
- ☐ Aspirin + dipyridamole lifelong

Aspirin + dipyridamole. Stop dipyridamole after 2 years

22%

Dipyridamole. Stop dipyridamole after 2 years

3%

Aspirin lifelong

14%

Warfarin

2%

Aspirin + dipyridamole lifelong

60%

Please see the 2010 NICE guidelines for more details. The 2-year limit has now been removed.

A 45-year-old female with a history of epilepsy is reviewed in the neurology clinic. Which one of the following features is most likely to be attributable to sodium valproate therapy?

- ☐ Clubbing
- ☐ Weight loss
- ☐ Hirsutism
- ☐ Renal impairment
- ☐ Tremor



Sodium valproate may cause tremor

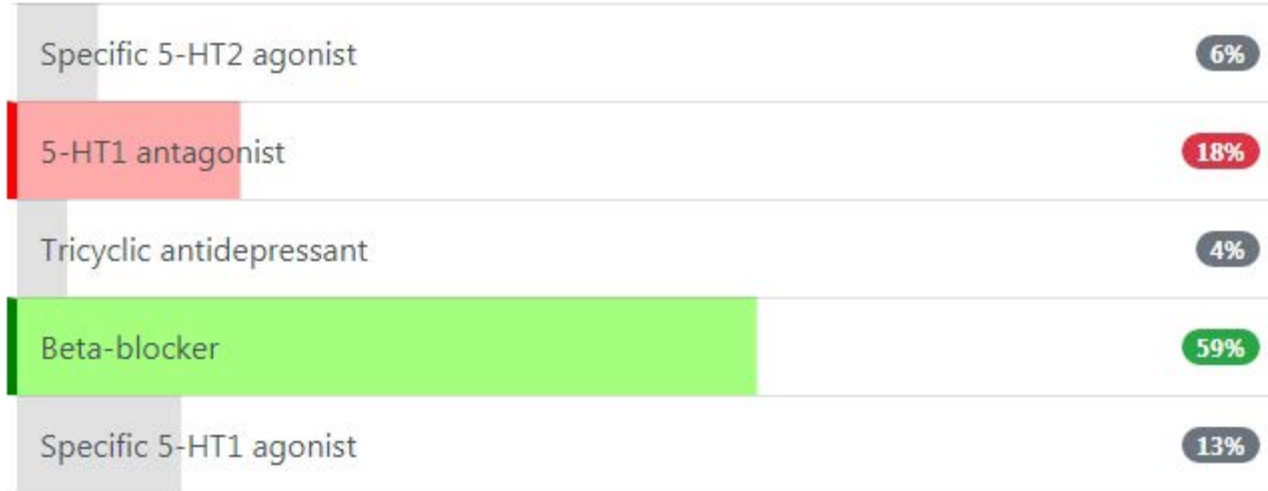
Important for me [Less important](#)

Alopecia is much more common than hirsutism in patients treated with sodium valproate.

In the BNF tremor is listed as a 'less frequent' side effect whereas hirsutism is listed as a 'very rare' side effect.

A 24-year-old female presents to her GP due to increased frequency of migraine attacks. She is now having around four migraines per month. Which type of medication would it be most appropriate to prescribe to reduce the frequency of migraine attacks?

- ☐ Specific 5-HT₂ agonist
- ☐ 5-HT₁ antagonist
- ☐ Tricyclic antidepressant
- ☐ Beta-blocker
- ☐ Specific 5-HT₁ agonist



Migraine

- acute: triptan + NSAID or triptan + paracetamol
- prophylaxis: topiramate or propranolol

Important for me Less important

Topiramate is also recommended by NICE as first-line prophylaxis against migraine. However, given that she is female and of child-bearing age a beta-blocker (such as propranolol) is a better choice.

A 20-year-old man presents to the neurology clinic with a 6 month history of deteriorating gait.

On examination he has a wide based gait, with past pointing and high arched feet. Knee and ankle reflexes are absent, but he has an extensor plantar response bilaterally. Fundoscopy reveals a pale optic disc. There is no impairment of cognition.

What is the most likely diagnosis?

- ☐ Wilson's disease
- ☐ Friedrich's ataxia
- ☐ Charcot-Marie-Tooth disease
- ☐ Motor neuron disease
- ☐ Bardet-Biedl syndrome

Wilson's disease	4%
Friedrich's ataxia	51%
Charcot-Marie-Tooth disease	28%
Motor neuron disease	9%
Bardet-Biedl syndrome	8%

The question describes someone with cerebellar signs, mixed lower motor neuron and upper motor neuron signs, pes cavus, optic atrophy with a normal IQ.

All of which would be present in Friedrich's ataxia. This normally presents in childhood and is autosomal recessive. Global spinal cord and cerebellar degeneration give a mixed pattern of degeneration. Retinal degeneration is common, as are cardiomyopathies and diabetes.

Wilson's disease can give ataxia due to excess copper deposition, however over neurological features may be Parkinsonian in nature e.g. resting tremor and bradykinesia. Wilson's does not give peripheral neuropathy. A typical Kayser-Fleischer ring of copper may be seen in the iris of patients, no retinal changes are seen.

Charcot-Marie-Tooth (also known as hereditary motor and sensory neuropathy), presents with pes cavus and peripheral motor/sensory neuropathy, but would not give cerebellar or visual symptoms.

Motor neuron disease presents with mixed upper and lower motor neuron weakness - as is seen here with absent tendon reflexes and extensor plantars, however it does not give cerebellar signs or affect the retina.

Bardet-Biedl syndrome is a rare autosomal recessive condition that gives retinitis pigmentosa, but also presents with obesity, polydactyly and frequently mental retardation.

A 66-year-old woman is investigated for ascites and found to have ovarian cancer. She presents due to 'unsteadiness'. On examination there is evidence of nystagmus and past-pointing. Which one of the following antibodies is most likely to be present?

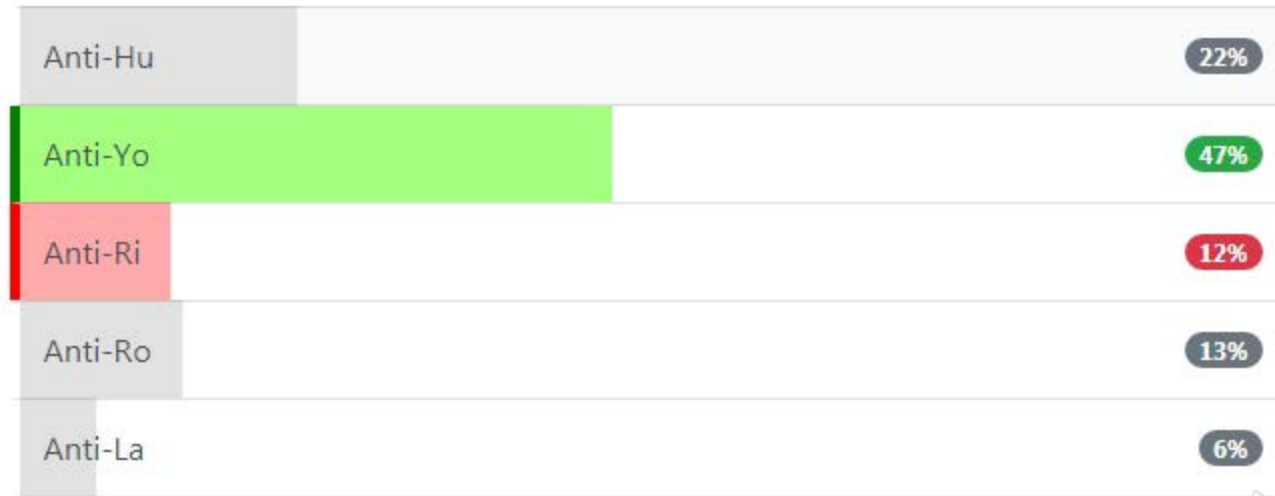
☐ Anti-Hu

☐ Anti-Yo

☐ Anti-Ri

☐ Anti-Ro

☐ Anti-La



This lady has developed cerebellar syndrome secondary to anti-Yo antibodies.

✓	✗	✗	✗
---	---	---	---

A 47-year-old with polycythaemia is admitted to the stroke unit with right leg weakness and difficulty speaking. His speech is halting and labored, although the words he is saying are making sense and he is not repeating himself. An MRI brain confirms a partial anterior circulation stroke affecting the middle cerebral artery (MCA) territory.

Given his symptoms, where is the most likely location of the infarct?

- ☐ Right superior temporal gyrus
- ☐ Left arcuate fasciculus
- ☐ Left inferior temporal gyrus
- ☐ Right superior frontal gyrus
- ☐ Left inferior frontal gyrus

Right superior temporal gyrus

6%

Left arcuate fasciculus

7%

Left inferior temporal gyrus

25%

Right superior frontal gyrus

9%

Left inferior frontal gyrus

53%

Broca's dysphasia: speech non-fluent, comprehension normal, repetition good

Important for me Less important

Type of dysphasia	Lesion location	Speech	Comprehension	Repetition
Wernicke's (receptive) dysphasia	Superior temporal gyrus	Fluent	Abnormal	Good
Conduction (associative) dysphasia	Arcuate fasciculus	Fluent	Abnormal	Poor
Broca's (expressive) dysphasia	Inferior frontal gyrus	Non-fluent	Normal	Good

The middle cerebral artery supplies medial part of cerebrum containing frontal lobe and medial temporal lobe and therefore supplies Broca's area in the inferior frontal gyrus.



Discuss (4)

Improve

Dr Assem

A elderly lady patient presents with arthritic pains. At the end of the consultation she tells you she has been to see a doctor at the memory clinic who diagnosed her with Alzheimer's dementia. She cannot remember why she was not given any tablets to help with this.

Which of the following would represent a relative contraindication to donepezil prescription?

- ☐ Patient on warfarin
- ☐ Mild Alzheimer's dementia
- ☐ Stage II renal impairment
- ☐ Resting bradycardia
- ☐ Mini-mental state examination (MMSE) score of 18

Patient on warfarin	8%
Mild Alzheimer's dementia	10%
Stage II renal impairment	8%
Resting bradycardia	65%
Mini-mental state examination (MMSE) score of 18	10%

Donepezil is generally avoided (relative contraindication) in patients with bradycardia and is used with caution in other cardiac abnormalities

Important for me Less important

Donepezil is not renally excreted and is therefore safe to give in renal failure. There is no interaction between donepezil and warfarin according to the BNF. It is licenced for use in mild to moderate Alzheimer's dementia (as indicated by an MMSE score of 18 in this question).

Dr. Assem

A 52-year-old gentleman with no past medical history presents to the emergency department accompanied by his wife. His wife reported finding him confused earlier in the day. Repetitive questioning was a prominent feature. He was able to recognise his wife and correctly reported his address and date of birth to paramedics. On arrival to the emergency department, he had recovered and was back to his normal self. The event lasted approximately 3 hours. A full neurological examination was normal. What is the most likely diagnosis?

- ☐ Epilepsy
- ☐ Transient psychogenic amnesia
- ☐ Transient global amnesia
- ☐ Brain tumour
- ☐ Transient ischaemic attack

Epilepsy	8%
Transient psychogenic amnesia	16%
Transient global amnesia	53%
Brain tumour	4%
Transient ischaemic attack	19%

Transient global amnesia is a clinical syndrome of uncertain aetiology, characterised by a discrete episode lasting for a few hours (always less than 24 hours) of anterograde amnesia, retrograde amnesia, repetitive questioning with an absence of other cognitive or neurological impairments.

Diagnostic criteria (in addition to the above features) are as follows; reliable witness to episode, the absence of head trauma or loss of consciousness at the onset, preserved personal identity and absence of epileptic features.

Epilepsy can present with discreet episodes of amnesia. This syndrome is called transient epileptic amnesia. Features that suggest epilepsy are; shorter duration (should be less than 1 hour), multiple attacks, onset on waking from sleep and accompanying epileptic features - e.g. motor automatism, stereotyped behaviours, limb shaking.

There are a small number of case reports where a brain tumour has been implicated in transient global amnesia, however, this is very rare. A transient ischaemic attack can present with isolated amnesia, however, this again is exceedingly rare.

Distinguishing transient global amnesia from transient psychogenic amnesia can be very difficult, however, transient global amnesia is the most likely diagnosis in this case due to the clinical features conforming to the classical description of transient global amnesia so closely.

A 32-year-old woman has been admitted to the emergency department after an accident with a car. As she was crossing the road she was hit by a car's bumper which made forceful contact with her leg. On closer examination you notice that the injury has manifested a foot drop. Which of the following nerves has been damaged in the accident?

☐ Common peroneal nerve

☐ Median nerve

☐ Medial plantar nerve

☐ Saphenous nerve

☐ Pudendal nerve

Common peroneal nerve	89%
Median nerve	3%
Medial plantar nerve	3%
Saphenous nerve	3%
Pudendal nerve	3%

The common peroneal nerve provides sensation and motor function to the lower leg. When compressed or damaged it can cause foot drop. This nerve crosses laterally to curve over posterior rim of the fibula. It then divides into the superficial and deep branches. It supplies the tibialis anterior, extensor hallucis longus, extensor digitorum longus and peroneus tertius. Combined, these allow dorsiflexion of the foot. It is more vulnerable to injury as it has a long course throughout the leg and is more superficial than other nerves. It is more prone to injury after a direct insult. Median nerve and pudendal nerves are not located in the leg.

An 84-year-old gentleman is seen in Neurology clinic with an abnormal gait. On questioning, you find that he has impairment of short-term memory and spatial awareness on the Montreal Cognitive Assessment. He is accompanied by his wife who reports that he has been having occasional incontinence of urine recently.

On examination, you notice that he has a magnetic gait and a postural tremor.

What is the likely underlying diagnosis?

- ☐ Lewy body dementia
- ☐ Idiopathic Parkinson's disease
- ☐ Multiple systems atrophy
- ☐ Normal pressure hydrocephalus
- ☐ Prion disease



The answer is normal pressure hydrocephalus which usually presents with a triad of urinary incontinence, dementia, parkinsonian-like or magnetic gait.

Lewy body dementia would present with visual hallucinations, idiopathic Parkinson's disease is not necessarily immediately associated with urinary incontinence as a prominent feature. Multiple systems atrophy typically has a cerebellar component and Prion disease is linked typically with myoclonus and a rapidly progressive dementia in a younger age demographic.

Which one of the following is a contraindication to the use of a triptan in the management of migraine?

- ☐ Concurrent pizotifen use
- ☐ Patients older than 55 years
- ☐ A history of epilepsy
- ☐ Previous intracranial tumour
- ☐ A history of ischaemic heart disease

Concurrent pizotifen use

9%

Patients older than 55 years

4%

A history of epilepsy

19%

Previous intracranial tumour

7%

A history of ischaemic heart disease

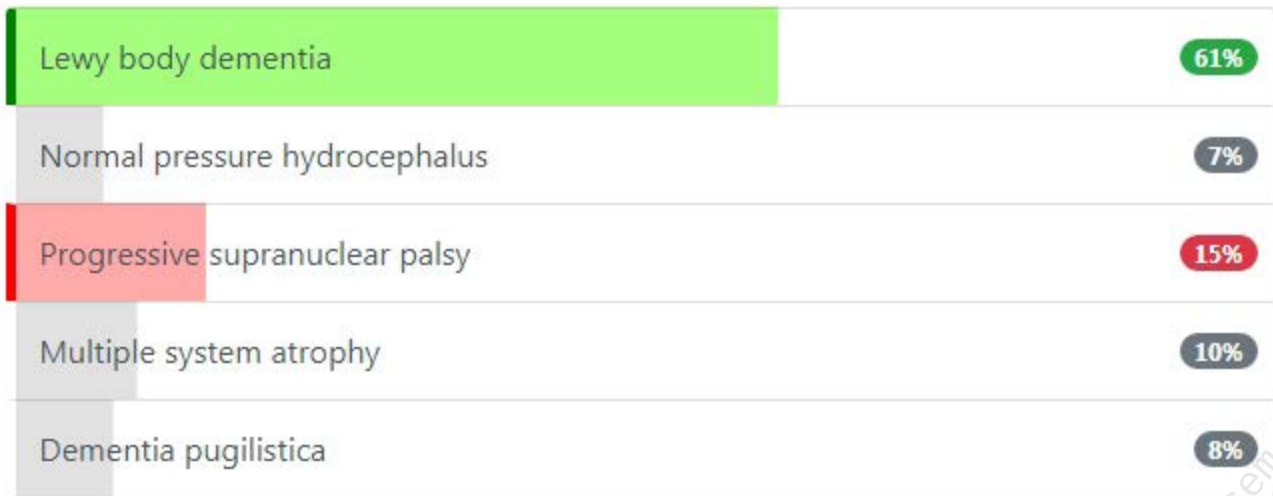
62%

Cardiovascular disease is a contraindication to triptan use

Important for me Less important

A 64-year-old man who is under investigation for parkinsonian symptoms is brought to the GP by his wife. She is concerned her husband is becoming increasingly agitated. The GP prescribes haloperidol. One week later the GP is called out to see the patient as his parkinsonian symptoms have deteriorated markedly. What is the most likely underlying diagnosis?

- ☐ Lewy body dementia
- ☐ Normal pressure hydrocephalus
- ☐ Progressive supranuclear palsy
- ☐ Multiple system atrophy
- ☐ Dementia pugilistica



Patients with Lewy body dementia are extremely sensitive to neuroleptic agents

A 39-year-old-male present with morning headaches associated with nausea for the last 2 months and an inability to look upwards. On examination, while upgaze is diminished bilaterally, downgaze is preserve and it is not corrected by the doll's-head-manoevre. On examination of his pupils, his pupils constrict on accommodation but did not constrict on exposure to light. One also notices some mild eyelid retraction bilaterally. Where is the lesion localised to?

- ☐ Frontal lobe
- ☐ Dorsal midbrain
- ☐ Ventral midbrain
- ☐ Occipital
- ☐ Cerebellar vermis

Dorsal midbrain	32%
Ventral midbrain	31%
Occipital	12%
Cerebellar vermis	18%

This patient has Parinaud syndrome as a result of a lesion at the dorsal midbrain. Lesions in the other four options do not result in Parinaud syndrome.

Rostral interstitial nucleus of medial longitudinal fasciculus lies at the dorsal midbrain and control vertical gaze. They project to the vestibular nuclei. It results in the following symptoms:

- Upward gaze palsy, often manifesting as diplopia
- Pupillary light-near dissociation (Pseudo-Argyll Robertson pupils)
- Convergence-retraction nystagmus

It's aetiology include:

- Brain tumours in the midbrain or pineal gland (pinealoma)
- Multiple sclerosis
- Midbrain stroke

A 45-year-old woman is found unconscious. Her neighbour tells you that she was taking multiple medications for depression and schizophrenia. She is brought in to the emergency department where she is unconscious, febrile at 40°C, systolic blood pressure of 180mmHg, heart rate 140/min, and has muscle rigidity and no myoclonus.

Her CK is 68,000 iu/L.

What is the most likely diagnosis?

- ☐ Serotonin syndrome
- ☐ Neuroleptic malignant syndrome
- ☐ Catatonia
- ☐ Malignant hyperthermia
- ☐ Acute dystonia

Serotonin syndrome	8%
Neuroleptic malignant syndrome	82%
Catatonia	2%
Malignant hyperthermia	5%
Acute dystonia	2%

The key distractor for this question is serotonin syndrome. They have virtually identical presenting features. Myoclonus is the distinguishing feature of serotonin syndrome (found only in serotonin syndrome). All the other features can be present in both conditions. Muscular rigidity points more towards NMS. Malignant hyperthermia is an effect of volatile inhalational anaesthetic agents and the muscle relaxant succinylcholine. It is caused by an autosomal dominant mutation in ryanodine receptor type 1 which encodes the calcium-release channel of the sarcoplasmic reticulum, and CACNA1S, which encodes the alpha subunit of the L-type calcium channel isoform of the sarcolemma (dihydropyridine receptor).

Features of both NMS and serotonin syndrome.

- Severe muscular rigidity
- Hyperthermia (temperature $>38^{\circ}\text{C}$)
- Autonomic instability
- Changes cognition or in the level of consciousness
- Rhabdomyolysis
- Recent commencement or change of dose of a medication

A 63-year-old woman with motor neuron disease is reviewed in clinic. Which one of the following interventions will have the greatest effect on survival?

☐ Regular chest physiotherapy

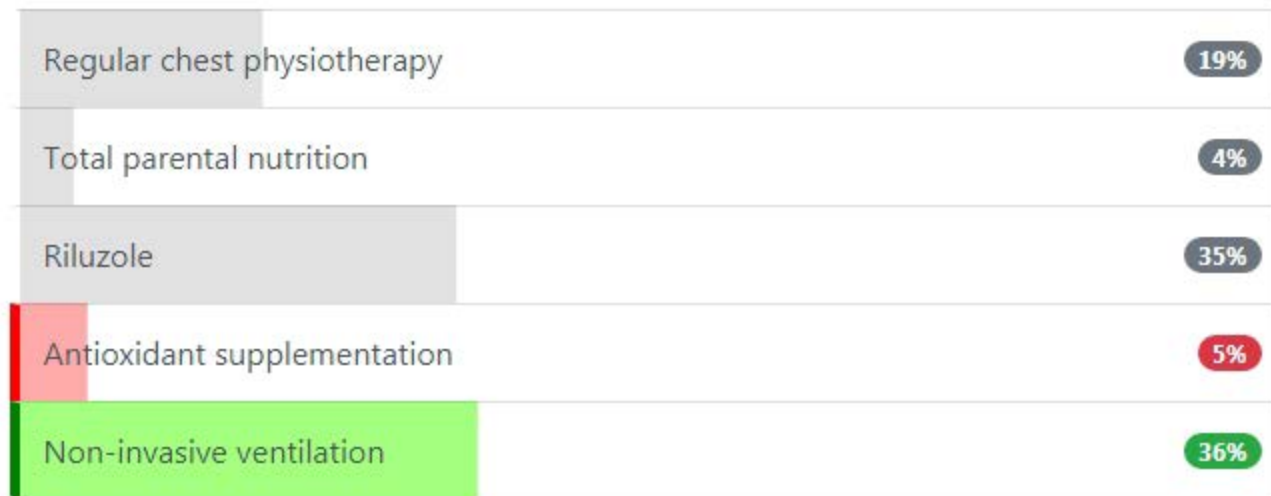
☐ Total parental nutrition

☐ Riluzole

☐ Antioxidant supplementation

☐ Non-invasive ventilation

A 63-year-old woman with motor neuron disease is reviewed in clinic. Which one of the following interventions will have the greatest effect on survival?



Motor neuron disease - treatment: NIV is better than riluzole

Important for me Less important

A 29-year-old woman with a past history of hypothyroidism presents to the surgery complaining of weakness, particularly of her arms, for the past four months. She has also developed double vision towards the end of the day, despite having a recent normal examination at the opticians. What is the most likely diagnosis?

☐ LambertEaton myasthenic syndrome

☐ Polymyositis

☐ Polymyalgia rheumatica

☐ Multiple sclerosis

☐ Myasthenia gravis

LambertEaton myasthenic syndrome

12%

Polymyositis

4%

Polymyalgia rheumatica

4%

Multiple sclerosis

9%

Myasthenia gravis

71%

A 61-year-old man presents to his GP with recurrent falls over the past few months. He reports that his legs feel weak and he has recently had difficulty doing up the buttons on his shirt. He reports no other symptoms and is otherwise well. His past medical history includes hypertension for which he takes amlodipine. On examination, he demonstrates bilateral foot drop with a high stepping gait. Power is reduced throughout both upper and lower limbs. Reflexes were brisk in the upper limbs but the knee and ankle reflexes could not be elicited. He demonstrated upgoing plantars. Coordination and sensation were intact throughout.

What is the most likely diagnosis?

- ☐ Guillain-Barre syndrome
- ☐ Amyotrophic lateral sclerosis
- ☐ Cervical spondylotic myelopathy
- ☐ Charcot-Marie-Tooth disease
- ☐ Lambert-Eaton myasthenic syndrome

Guillain-Barre syndrome	5%
Amyotrophic lateral sclerosis	55%
Cervical spondylotic myelopathy	17%
Charcot-Marie-Tooth disease	17%
Lambert-Eaton myasthenic syndrome	6%

Amyotrophic lateral sclerosis is associated with mixed UMN and LMN signs (usually no sensory deficits)

Important for me Less important

Amyotrophic lateral sclerosis (ALS) is a type of motor neurone disease (MND). Degeneration of neurones in the motor cortex and in the ventral spinal cord produces mixed UMN and LMN signs. There are no associated sensory deficits.

Guillain-Barre syndrome (GBS) is an inflammatory peripheral neuropathy so will not present with upper motor neurone signs. There is nothing in the history to suggest a recent bacterial or viral infection. GBS is often accompanied by sensory disturbances (both motor and sensory nerves of the peripheral nervous system are attacked by the immune system).

Cervical spondylotic myelopathy – cervical spondylosis is the term used for osteoarthritis of the spine and can result in compression of the spinal cord. This is more likely to result in LMN signs at the level of the compression (ie. upper limb if the lesion is below C5) with UMN signs below (in the lower limb). Patients usually complain of neck pain and stiffness.

Charcot-Marie-Tooth syndrome – a hereditary sensory and motor peripheral neuropathy. UMN signs are not present in these patients. Patients can present with lower motor neurone signs in all limbs and reduced sensation (more pronounced distally).

Lambert-Eaton myasthenic syndrome – a rare autoimmune disorder involving the neuromuscular junction, so UMN signs will be absent. This condition is associated with small-cell lung cancer.

You are a GP reviewing letters for your patients. The next letter you come across is from an elderly gentleman you referred to the memory clinic for increasing forgetfulness.

You note that he has been given a diagnosis of vascular dementia. Which of the following treatments is most likely to have been recommended?

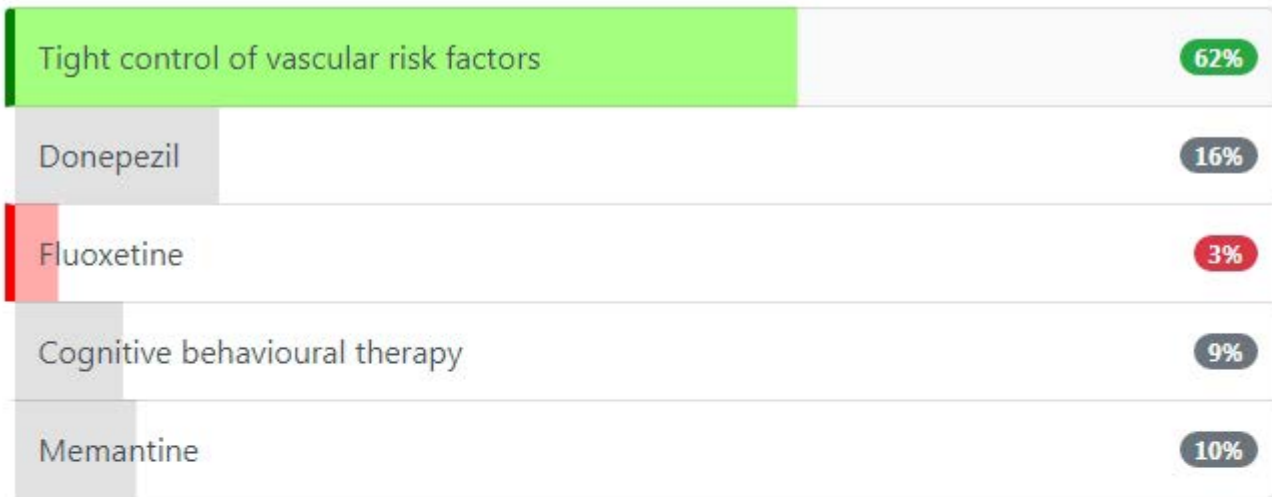
☐ Tight control of vascular risk factors

☐ Donepezil

☐ Fluoxetine

☐ Cognitive behavioural therapy

☐ Memantine



Tight control of vascular risk factors, rather than antidementia medication, is recommended by NICE in vascular dementia

Important for me Less important

Cholinesterase inhibitors are licenced for use in Alzheimer's and mixed dementias. They are not recommended for the treatment of vascular dementia. NICE recommend tight control of vascular risk factors in order to slow progression of the disease.

A 42-year-old woman with a history of myasthenia gravis is admitted to the Emergency Department. She is currently taking pyridostigmine but there has been a significant worsening of her symptoms following antibiotic treatment for a chest infection. On examination she is dyspnoeic and cyanotic with quiet breath sounds in both lungs. Other than respiratory support, what are the two treatments of choice?

- ☐ IV methylprednisolone or plasmapheresis
- ☐ IV methylprednisolone or intravenous immunoglobulins
- ☐ Plasmapheresis or atropine
- ☐ IV methylprednisolone or atropine
- ☐ Plasmapheresis or intravenous immunoglobulins

IV methylprednisolone or plasmapheresis	16%
IV methylprednisolone or intravenous immunoglobulins	23%
Plasmapheresis or atropine	5%
IV methylprednisolone or atropine	4%
Plasmapheresis or intravenous immunoglobulins	51%

This patient is having a myasthenic crisis. Opinions vary as to whether plasmapheresis or intravenous immunoglobulins should be given first-line. Plasmapheresis usually works quicker but involves more expensive equipment

A 67-year old male recently attended A&E, with a 3 month history of bilateral paraesthesias and twitching affecting the thumb, first finger and lateral forearm. He denied any trauma. A MRI scan of his spine was performed and revealed cervical canal stenosis with mild cord compression. He was discharged and advised to see his GP for follow-up. Which of the following is the most appropriate initial step in management?

- ☐ Refer to spinal surgery services
- ☐ Refer for locally commissioned cervical root injections and review after 6 weeks
- ☐ Enlist on the weekly minor ops clinic for carpal tunnel decompression
- ☐ Commence neuropathic analgesia in the first instance and consider surgical evaluation if this does not work
- ☐ Refer to physiology services and review in 6 weeks

Refer to spinal surgery services	57%
Refer for locally commissioned cervical root injections and review after 6 weeks	4%
Enlist on the weekly minor ops clinic for carpal tunnel decompression	3%
Commence neuropathic analgesia in the first instance and consider surgical evaluation if this does not work	24%
Refer to physiology services and review in 6 weeks	12%

Bilateral median nerve dysfunction is very suggestive of a diagnosis of degenerative cervical myelopathy (DCM) rather than bilateral carpal tunnel syndrome (option C). DCM should be suspected in elderly patients presenting with limb neurology. His twitches are probably fibrillations, a sign of lower motor neuron dysfunction.

Degenerative cervical myelopathy is associated with a delay in diagnosis, estimated to be >2 years in some studies [1]. It is most commonly misdiagnosed as carpal tunnel syndrome and in one study, 43% of patients who underwent surgery for degenerative cervical myelopathy, had been initially diagnosed with carpal tunnel syndrome [1]. Management of these patients should be by specialist spinal services (neurosurgery or orthopaedic spinal surgery). Decompressive surgery is the mainstay of treatment and has been shown to stop disease progression. Physiotherapy and analgesia does not replace surgical opinion, though they may be used alongside (options D and E). Nerve root injections do not have a role in management (option B).

1. Behrbalk E, Salame K, Regev GJ, Keynan O, Boszczyk B, Lidar Z. Delayed diagnosis of cervical spondylotic myelopathy by primary care physicians. *Neurosurg Focus*. 2013 Jul;35(1):E1.

A 23-year-old man is referred to neurology clinic. He describes episodes of leg weakness following bouts of laughing whilst out with friends. The following weekend his friends described a brief collapse following a similar episode. What is the most likely diagnosis?

- ☐ Stokes-Adams attack
- ☐ Cataplexy
- ☐ Hypokalaemic periodic paralysis
- ☐ Absence seizure
- ☐ Myasthenia gravis

Stokes-Adams attack

20%

Cataplexy

64%

Hypokalaemic periodic paralysis

8%

Absence seizure

6%

Myasthenia gravis

3%

A 62-year-old man is admitted to the Emergency Department with a left hemiplegia. His symptoms started around 5 hours but he initially thought he had slept in an awkward position. He has no past medical history of note but on examination is found to have an irregular pulse of 150 / min. The ECG confirms atrial fibrillation. A CT head is immediately arranged and reported as normal. What is the most appropriate initial management?

- ☐ Aspirin
- ☐ Aspirin + dipyridamole
- ☐ Alteplase
- ☐ Warfarin
- ☐ Aspirin + warfarin

Aspirin	57%
Aspirin + dipyridamole	15%
Alteplase	6%
Warfarin	10%
Aspirin + warfarin	12%

Rate control should also be initiated. He is outside the thrombolysis window so alteplase is not an option. The 2004 RCP guidelines recommend that anticoagulation should be commenced 14 days after an ischaemic stroke. Earlier anticoagulation may exacerbate any secondary haemorrhage.

Dipyridamole should not be used in the acute phase.

A 29-year-old female presents complaining of weakness in her arms, leading to increasing difficulties at work. On examination she has a bilateral ptosis and loss of the red-reflex in both eyes. Urine testing also reveals glycosuria. What is the most likely diagnosis?

☐ Myotonic dystrophy

☐ Homocystinuria

☐ Multiple sclerosis

☐ Myasthenia gravis

☐ HIV

Myotonic dystrophy

44%

Homocystinuria

30%

Multiple sclerosis

7%

Myasthenia gravis

16%

HIV

3%

Dystrophia myotonica - DM1

- **d**istal weakness initially
- autosomal **d**ominant
- **d**iabetes
- **d**ysarthria

Important for me Less important

These features are typical of myotonic dystrophy. The red-reflex is lost due to bilateral cataracts

You are on the night on-call team, and a 76-year-old woman on one of your wards has developed increasing confusion. She is wandering around the ward asking for her husband and is shouting at staff and other patients. She was admitted this morning with a high fever and a one-week history of a productive, purulent cough. She also has a history of Parkinson's disease.

Nursing staff have been unable to calm her and she has now started to throw objects and hit staff members. The nurses have however been able to give you the following obs:

Temperature	37.8°C
Heart Rate	105 bpm
BP	138/78 mmHg
SaO ₂	95% on room air
Blood glucose	5 mmol/L

Which of the following is the most appropriate treatment?

- ☐ Immediate release carbidopa-levodopa
- ☐ Olanzapine
- ☐ Lorazepam
- ☐ Amitriptyline
- ☐ Haloperidol

Immediate release carbidopa-levodopa

7%

Olanzapine

6%

Lorazepam

42%

Amitriptyline

3%

Haloperidol

41%

Anti-psychotics should be avoided in delirious patients with a background of Parkinson's disease

Important for me Less important

This lady is currently suffering from delirium, a common issue in elderly patients in hospital. The combination of an underlying infection and the dark environment of the ward at night are likely contributing to her acute confusional state.

Haloperidol and other antipsychotic medications are recommended first-line treatment options when nursing strategies have failed, however, these should not be used in patients with a background of Parkinson's disease. Anti-psychotics often have strong anti-dopaminergic action, and as such in a patient with Parkinson's, they will make their condition significantly worse. As such, lorazepam is the most suitable option.

Immediate release levodopa would not be helpful in this situation as this lady's confusion is not due to her Parkinson's disease. While Parkinson's disease can cause behavioural changes, they tend to be more chronic, progressive and less labile in nature.

You are called to see a 62-year-old female inpatient, with a known history of epilepsy, who is having a seizure. The nurse who witnessed the seizure says it began by affecting her right hand before involving her entire right arm and then progressing to a loss of consciousness with her entire body shaking. What is the most likely diagnosis?

- ☐ Generalised tonic-clonic
- ☐ Focal impaired awareness seizure
- ☐ Jacksonian march with secondary generalisation
- ☐ Focal aware seizure
- ☐ Myoclonic

Generalised tonic-clonic	14%
Focal impaired awareness seizure	12%
Jacksonian march with secondary generalisation	66%
Focal aware seizure	3%
Myoclonic	5%

A Jacksonian march is a type of focal aware seizure.

Focal highlights how it is focal epilepsy that involves abnormal electrical activity in just one part of the brain.

It characteristically starts by affecting a peripheral body part such as a toe, finger or section of the lip and then spreads quickly 'marches' over the respective foot, hand or face.

In some with Jacksonian march seizures (as in this case), the electrical disorder spreads over larger areas of the brain, causing the seizure to develop into a tonic-clonic seizure.

A 19-year-old female presents complaining of visual disturbance. Examination reveals a bitemporal hemianopia with predominately the lower quadrants being affected. What is the most likely lesion?

- ☐ Brainstem lesion
- ☐ Craniopharyngioma
- ☐ Frontal lobe lesion
- ☐ Pituitary macroadenoma
- ☐ Right occipital lesion

Brainstem lesion

3%

Craniopharyngioma

59%

Frontal lobe lesion

4%

Pituitary macroadenoma

29%

Right occipital lesion

5%

Bitemporal hemianopia

- lesion of optic chiasm
- upper quadrant defect > lower quadrant defect = inferior chiasmal compression, commonly a pituitary tumour
- lower quadrant defect > upper quadrant defect = superior chiasmal compression, commonly a craniopharyngioma

Important for me Less important

A 48-year-old male presents to the Emergency department with acute visual changes. He has a past medical history of hypertension and type 2 diabetes mellitus.

On examination, his upper and lower limbs are normal neurologically. On examination of his cranial nerves, you note a homonymous hemianopia with central preservation.

Where is the likely cause of his problems within the central nervous system?

- ☐ Optic tract
- ☐ Optic radiation
- ☐ Optic chiasm
- ☐ Optic nerve
- ☐ Temporal lobe

Optic tract	20%
Optic radiation	48%
Optic chiasm	16%
Optic nerve	6%
Temporal lobe	9%

The answer is the optic radiation. Lesions in this area can cause a homonymous hemianopia with macular sparing which is as a result of collateral circulation offered to macular tracts by the middle cerebral artery.

Lesions in the optic tract also cause a homonymous hemianopia but without macular sparing. Lesions in the optic chiasm, optic nerve, and temporal lobe cause bitemporal hemianopia, ipsilateral complete blindness, and superior homonymous quadrantanopia respectively.

A 72-year-old man becomes confused at the end of a charity walk for Alzheimer's. He is brought to the hospital by paramedics because he repeatedly asked other attendees on the walk why he was there and how he had got there. There is no past medical history of note and he takes no regular medication. He is orientated in time and person and knows he has been brought to the hospital. His blood pressure is 123/82 mmHg, his pulse is 70 beats per minute and regular. The neurological exam is unremarkable, routine blood tests and CT head are normal. He gradually recovers over the course of 3hrs.

What is the most appropriate intervention?

- ☐ Aspirin
- ☐ Clopidogrel
- ☐ Reassurance
- ☐ Rivaroxaban
- ☐ Warfarin

Aspirin	21%
Clopidogrel	10%
Reassurance	63%
Rivaroxaban	3%
Warfarin	3%

The most likely diagnosis here, with acute onset of retrograde amnesia with preserved orientation and consciousness, is transient global amnesia, (TGA). The exact cause of TGA is unclear, although it may be similar in aetiology to migraines. There is no evidence in prospective cohort studies to suggest an association between TGA and increased risk of stroke.

Aspirin and clopidogrel, both antiplatelet agents, are not indicated here because TGA does not mark out the patient as being at increased risk of ischaemic stroke. Rivaroxaban and warfarin are both indicated for anticoagulation in patients with atrial fibrillation, which hasn't been identified here.

A 68-year-old man undergoes a lumbar puncture to investigate new confusion. His platelet count is normal, and his clotting screen is within an acceptable range. The procedure is discussed with his family as he is unable to consent and they are happy with the procedure but want to ensure that the possibility of post lumbar puncture headache is minimised. What factor has been demonstrated to increase the likelihood of a post-LP headache?

- ☐ Small needle gauge
- ☐ Replacing the stylet during the procedure
- ☐ Keeping the bevel of the needle parallel to the dura
- ☐ Early mobilisation following procedure
- ☐ Use of a Quincke (sharp) needle

Small needle gauge	7%
Replacing the stylet during the procedure	16%
Keeping the bevel of the needle parallel to the dura	14%
Early mobilisation following procedure	30%
Use of a Quincke (sharp) needle	32%

Sharp needles have been found to be associated with a greater frequency of post-lumbar puncture headaches when compared to atraumatic needles inserted using an introducer. Using a small needle, replacing the stylet and maintaining the bevel parallel decreases the chance of developing a post-lumbar puncture headache, whilst early mobilisation has no impact.

Johnson, Kimberley S., and Daniel J. Sexton. 'Lumbar Puncture: Technique, Indications, Contraindications, and Complications in Adults.' UpToDate. 3 Feb. 2016.

A 60-year-old gentleman with a background of lumbar spondylosis and chronic back pain presents with gradually worsening bilateral upper limb paraesthesias and leg stiffness. Which one of the investigations below is diagnostic for his likely condition?

- ☐ Nerve conduction studies and EMG
- ☐ MRI Cervical spine
- ☐ MRI Lumbar Spine
- ☐ CT C-spine
- ☐ AP and lateral C-spine radiographs

Nerve conduction studies and EMG

7%

MRI Cervical spine

61%

MRI Lumbar Spine

26%

CT C-spine

3%

AP and lateral C-spine radiographs

3%

The presence of upper limb neurological symptoms indicates that there is pathology either within his cervical spinal cord or brain. Brain disease is more likely to cause unilateral problems.

A MRI lumbar spine would therefore not provide a unifying diagnosis here.

In the context of known lumbar degenerative spine, degenerative cervical myelopathy is the number one differential for this presentation. An MRI of the cervical spine is the gold standard test where cervical myelopathy is suspected. It may reveal disc degeneration and ligament hypertrophy, with accompanying cord signal change. It is not uncommon for patients to suffer from tandem (cervical and lumbar) stenosis.

Other answers:

- CT imaging is reserved for patients with contraindications to magnetic resonance imaging. A CT myelogram is the first line investigation in this case
- Radiographs are not clinically useful in the workup of these patients, though osteoarthritic changes (e.g. osteophytes) can be visible if they are performed.
- Other investigations (e.g. nerve conduction studies, EMG) may be performed when the clinical picture is unclear. These can help to exclude mononeuropathies and other lower motor neuron disorders. However, where there is strong clinical suspicion and the diagnosis is suspected, an MRI of the cervical spine should be performed.

A 29-year-old man presents complaining of visual disturbance. Examination reveals a right superior homonymous quadrantanopia. Where is the lesion most likely to be?

- ☐ Optic chiasm
- ☐ Left temporal lobe
- ☐ Right temporal lobe
- ☐ Left optic nerve
- ☐ Left parietal lobe

Optic chiasm

9%

Left temporal lobe

51%

Right temporal lobe

17%

Left optic nerve

9%

Left parietal lobe

14%

Visual field defects:

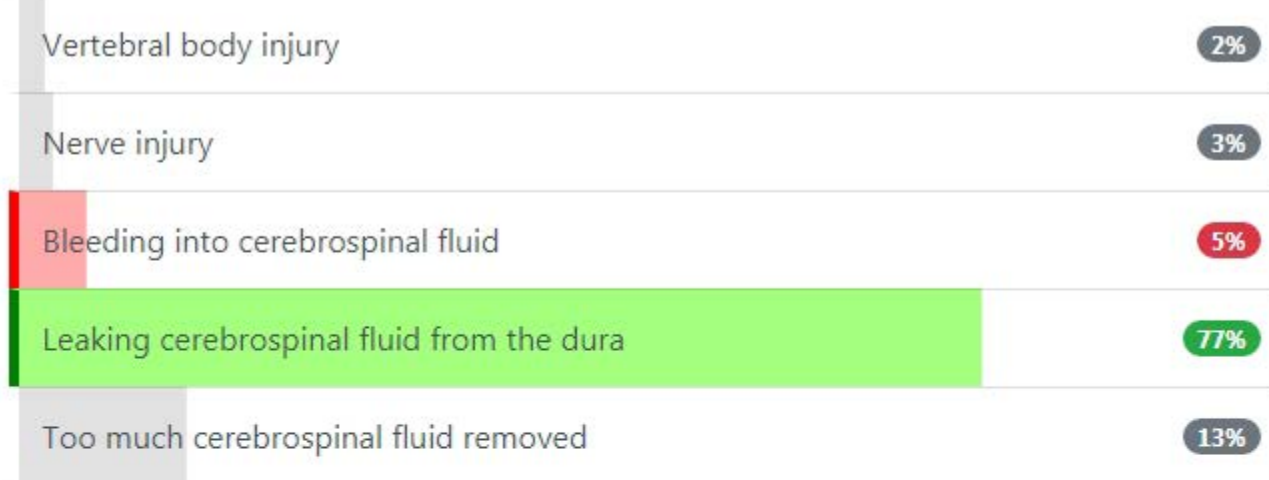
- left homonymous hemianopia means visual field defect to the left, i.e. lesion of right optic tract
- homonymous quadrantanopias: PITS (Parietal-Inferior, Temporal-Superior)
- incongruous defects = optic tract lesion; congruous defects = optic radiation lesion or occipital cortex

Important for me

Less important

A 23-year-old woman undergoes a planned lumbar puncture (LP) as part of neurological investigations for possible multiple sclerosis. During the consent process, she expresses concern about a post-LP headache. What is the mechanism of post-LP headaches?

- ☐ Vertebral body injury
- ☐ Nerve injury
- ☐ Bleeding into cerebrospinal fluid
- ☐ Leaking cerebrospinal fluid from the dura
- ☐ Too much cerebrospinal fluid removed



Leaking of cerebrospinal fluid from the dura is the most likely explanation for post-lumbar puncture headaches. It is thought that ongoing leak of cerebrospinal fluid (CSF) through the puncture site causes ongoing CSF loss, leading to low pressure. A post-LP headache is typically frontal or occipital and occurs within three days. It is normally associated with worsening on standing and improvement when lying down. Treatment in severe cases includes an epidural blood patch, but most resolve on their own.

Vertebral body injury, nerve injury and bleeding would not cause headaches, whilst the loss of cerebrospinal fluid volume during lumbar puncture does not cause pain.

A 55-year-old man presents due to an uncontrollable urge to move his legs during the night-time. He has also experience the sensation of spiders crawling over his legs. Simple measures such as walking and massaging the affected limb have not alleviated the problem. What is the most appropriate medical therapy?

☐ Selective serotonin reuptake inhibitor

☐ Low-dose tricyclic antidepressant

☐ Dopamine agonist

☐ 5-HT₃ antagonist

☐ Dopamine antagonist

Selective serotonin reuptake inhibitor

9%

Low-dose tricyclic antidepressant

23%

Dopamine agonist

51%

5-HT₃ antagonist

5%

Dopamine antagonist

11%

Restless leg syndrome - management includes dopamine agonists such as ropinirole

Important for me Less important

You are reviewing a 22-year-old man who has developed headaches. Which one of the following features is most typical of migraines?

- ☐ Pain on neck flexion
- ☐ Phonophobia
- ☐ Epiphora
- ☐ Recent viral illness
- ☐ Bilateral, 'tight-band' like pain

Pain on neck flexion

5%

Phonophobia

71%

Epiphora

14%

Recent viral illness

3%

Bilateral, 'tight-band' like pain

7%

Phonophobia occurs in around three-quarters of patients.

A 63-year-old man is diagnosed as having restless legs syndrome. What is the most relevant blood test to perform?

☐ ESR

☐ Ferritin

☐ Blood glucose

☐ Urea and electrolytes

☐ Liver function tests

ESR

6%

Ferritin

58%

Blood glucose

6%

Urea and electrolytes

23%

Liver function tests

6%

Restless legs syndrome - ferritin is the single most important blood test

Important for me

Less important

A case could be made for all the above tests but a low serum ferritin is most likely to be a cause of secondary restless legs syndrome

A 45-year-old male presents with recent aggressive behaviour, depression, chorea and athetosis. His father had similar symptoms at the age of 65. A neurodegenerative disorder with trinucleotide repeat expansion is suspected.

Which of the following trinucleotide repeats is most likely present?

☐ GAA

☐ GCC

☐ CGG

☐ CTG

☐ CAG



There is a repeat expansion of CAG trinucleotide in Huntington's disease

Important for me Less important

This patient has Huntington's disease, an autosomal dominant condition, which has CAG trinucleotide repeats.

Other important commonly tested trinucleotide repeats:

- GAA: Friedrich Ataxia
- CTG: Myotonic dystrophy
- CGG: Fragile X syndrome

A 25-year-old woman presents with recurrent attacks of 'dizziness'. These attacks typically last around 30-60 minutes and occur every few days or so. During an attack 'the room seems to be spinning' and the patient often feels sick. These episodes are often accompanied by a 'roaring' sensation in the left ear. Otoscopy is normal but Weber's test localises to the right ear. What is the most likely diagnosis?

- ☐ Acoustic neuroma
- ☐ Vestibular neuritis
- ☐ Benign paroxysmal positional vertigo
- ☐ Multiple sclerosis
- ☐ Meniere's disease



In sensorineural hearing loss Weber's test localises to the contralateral ear.

A 70-year-old man is investigated for involuntary, jerking movements of his arms. His symptoms seem to resolve when he is asleep. Damage to which one of the following structures may lead to hemiballism?

- ☐ Substantia nigra
- ☐ Red nucleus
- ☐ Subthalamic nucleus
- ☐ Globus pallidus
- ☐ Frontal lobe

Substantia nigra

9%

Red nucleus

4%

Subthalamic nucleus

74%

Globus pallidus

10%

Frontal lobe

3%

Hemiballism is caused by damage to the subthalamic nucleus

Important for me Less important

Which of the following features is least likely to be found in a patient with tuberous sclerosis?

- ☐ Shagreen patches
- ☐ Café-au-lait spots
- ☐ Retinal hamartomas
- ☐ Axillary freckling
- ☐ Renal angiomyolipomata

Shagreen patches

10%

Café-au-lait spots

17%

Retinal hamartomas

12%

Axillary freckling

50%

Renal angiomyolipomata

12%

Axillary freckling is seen in neurofibromatosis

A 17-year-old male presents to the emergency department (ED) following a head injury during a rugby match.

His parents who witnessed the injury tell you he lost consciousness immediately after the collision for a number of minutes. He was then alert and himself for a couple of hours. They have now brought him to ED as he became drowsy and was complaining of a headache.

On examination his Glasgow coma scale (GCS) is 12, the pupils are unequal and there is a clear swelling on the right side of the head.

Given the likely diagnosis of an intracranial haemorrhage, which vessel has most likely been damaged?

- ☐ Bridging veins
- ☐ Carotid artery
- ☐ Circle of Willis
- ☐ Dural artery
- ☐ Middle meningeal artery

Bridging veins	15%
Carotid artery	5%
Circle of Willis	7%
Dural artery	15%
Middle meningeal artery	58%

Extradural or subdural haemorrhage? Extradural = lucid period, usually following major head injury. Subdural = fluctuating consciousness, often following trivial injury in the elderly or alcoholics

Important for me Less important

This is a classic presentation of an extradural haemorrhage with a Lucid interval after which the patient deteriorates.

Tearing of bridging veins is the primary pathology in a subdural haematoma.

Carotid artery - is not intracranial.

The Circle of Willis is the most common location for berry aneurysms to burst - this results in a subarachnoid haemorrhage and would classically present with a 'thunderclap headache'.

Dural artery - does not exist.

Damage to the middle meningeal artery is the primary pathology in extradural haematomas.

Which one of the following side-effects is least associated with the use of levodopa?

- ☐ Psychosis
- ☐ 'On-off' effect
- ☐ Postural hypotension
- ☐ Cardiac arrhythmias
- ☐ Galactorrhoea

Psychosis

8%

'On-off' effect

6%

Postural hypotension

10%

Cardiac arrhythmias

17%

Galactorrhoea

58%

Dr. Arsem

A 33-year-old female with multiple sclerosis complains that her vision becomes blurred during a hot bath. What is this an example of?

☐ Uhthoff's phenomenon

☐ Oppenheim's sign

☐ Werdnig-Hoffman's sign

☐ Lambert's sign

☐ Lhermitte's sign

Uhthoff's phenomenon	72%
Oppenheim's sign	6%
Werdnig-Hoffman's sign	5%
Lambert's sign	4%
Lhermitte's sign	12%

This is Uhthoff's phenomenon. Lhermitte's sign describes paraesthesiae in the limbs on neck flexion

Oppenheim's sign is seen when scratching of the inner side of leg leads to extension of the toes. It is a sign of cerebral irritation and is not related to multiple sclerosis

Werdnig-Hoffman's disease is also known as spinal muscular atrophy

Which one of the following is not a recognised adverse effect of phenytoin use?

☐ Slurred speech

☐ Nystagmus

☐ Gynaecomastia

☐ Diplopia

☐ Ataxia

Slurred speech

15%

Nystagmus

8%

Gynaecomastia

53%

Diplopia

15%

Ataxia

9%

A 35-year-old man presents with progressive weakness of his hands. On examination you notice wasting of the small muscles of the hand. A diagnosis of syringomyelia is suspected. Which one of the following features would most support this diagnosis?

- ☐ Hyper-reflexia in the upper limbs
- ☐ Loss of vibration sensation in the hands
- ☐ Loss of temperature sensation in the hands
- ☐ Loss of light touch sensation in the hands
- ☐ Fasciculation of the small muscles of the hand

Hyper-reflexia in the upper limbs

12%

Loss of vibration sensation in the hands

13%

Loss of temperature sensation in the hands

50%

Loss of light touch sensation in the hands

10%

Fasciculation of the small muscles of the hand

15%

Syringomyelia - spinothalamic sensory loss (pain and temperature)

Important for me Less Important

A 21-year-old with a known Chiari 1 malformation undergoes a spinal MRI scan. The imaging reveals a cervical and thoracic syringomyelia. On closer examination, the patient is noted to have a cape-like loss of sensation to pain and temperature, but normal fine touch and proprioception.

Which of the following spinal cord structures are affected in order to cause this pattern of signs?

- ☐ Dorsal columns
- ☐ Spinocerebellar tract
- ☐ Anterior white commissure
- ☐ Dorsal root ganglion
- ☐ Corticospinal tract

Dorsal columns	18%
Spinocerebellar tract	23%
Anterior white commissure	35%
Dorsal root ganglion	8%
Corticospinal tract	17%

Syringomyelia classically presents with cape-like loss of pain and temperature sensation due to compression of the spinothalamic tract fibres decussating in the anterior white commissure of the spine

Important for me Less important

As the syringomyelia progresses it will first cause compression of the spinothalamic tract as they decussate in the anterior white commissure. This results in loss of sensation of pain, temperature and non-discriminative touch. A cape-like distribution is a classic finding in syringomyelia.

The dorsal columns are in the posterior columns and the remaining tracts are in the lateral spinal cord and so are not affected first. The dorsal root ganglia are not within the spinal cord, so would not be affected at all.

Which one of the following antibodies is associated with ocular opsoclonus-myoclonus in patients with breast cancer?

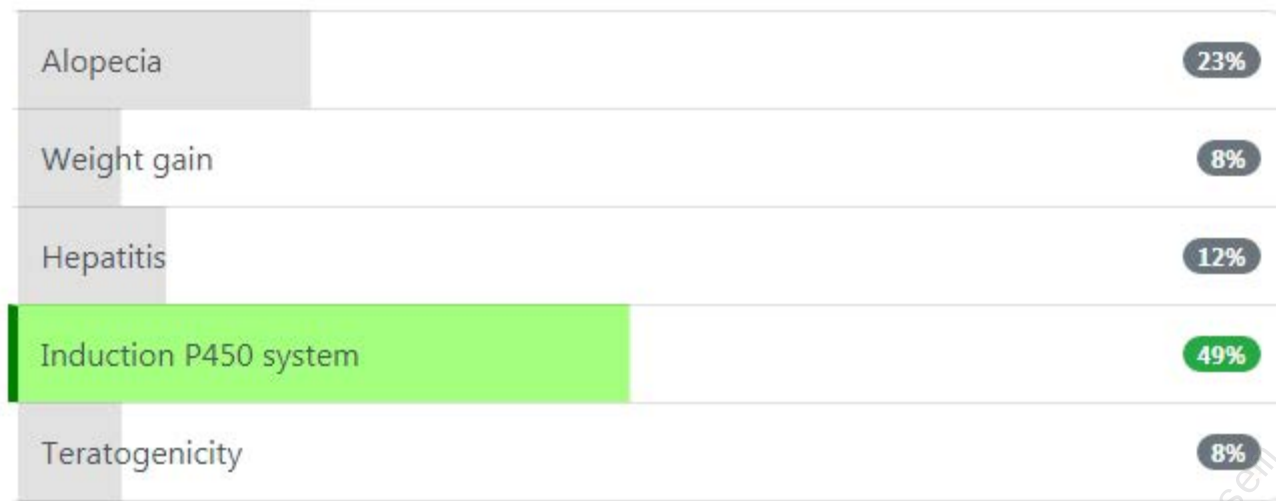
☐ Anti-Hu

☐ Anti-La

☐ Anti-GAD

☐ Anti-Yo

☐ Anti-Ri



Sodium valproate causes inhibition of the P450 system

You are called to review a 55-year-old man on the wards who started fitting around 5 minutes ago. He was admitted three days ago following an acute coronary syndrome. His past medical history includes tonic-clonic epilepsy which is generally well controlled on sodium valproate. On your arrival he is still fitting. Oxygen saturations are 99% on 100% oxygen and his pulse rate is 96/min. Intravenous access is already in-situ. What is the most appropriate next step?

- ☐ Observe for a further 5 minutes to see if the seizure stops spontaneously
- ☐ Give IV lorazepam
- ☐ Give buccal midazolam
- ☐ Give IV phenytoin
- ☐ Fast-bleep an anaesthetic doctor

Observe for a further 5 minutes to see if the seizure stops spontaneously	5%
Give IV lorazepam	76%
Give buccal midazolam	6%
Give IV phenytoin	10%
Fast-bleep an anaesthetic doctor	3%

IV lorazepam is the first-line treatment in patients with early status epilepticus

Important for me Less important

As the patient has intravenous access it is most appropriate to give a benzodiazepine parentally due to the more certain absorption. Lorazepam may be repeated once after 10 minutes.

Intravenous phenytoin is the next line treatment if the seizure fails to stop. Guidelines vary at when this should happen but generally 20-30 minutes is used as a cut-off.

A patient presenting to the emergency department undergoes a CT head scan. The report describes a hypodense collection around the convexity of the brain that is not limited to suture lines.

What is the most likely radiological diagnosis?

- ☐ Subarachnoid haemorrhage
- ☐ Extradural haematoma
- ☐ Acute subdural haematoma
- ☐ Chronic subdural haematoma
- ☐ Intracerebral haematoma

Subarachnoid haemorrhage

12%

Extradural haematoma

24%

Acute subdural haematoma

19%

Chronic subdural haematoma

40%

Intracerebral haematoma

6%

On CT imaging, a chronic subdural haematoma will appear as a hypodense (dark), crescentic collection around the convexity of the brain

Important for me Less important

On CT imaging, acute haematomas appear bright (hyperdense) whereas chronic haematomas appear dark (hypodense). Extradural haematomas are limited by suture lines whereas subdural haematomas are not. Intraparenchymal haematomas arise within the brain substance. Subarachnoid haemorrhage are typically seen as hyperdensity within the basal cisterns and sulci of the subarachnoid space.

How long should a patient stop driving for following a stroke?

- ☐ No restriction unless physical/visual impairment
- ☐ 1 month
- ☐ 3 month
- ☐ 6 months
- ☐ 12 months

No restriction unless physical/visual impairment

17%

1 month

42%

3 month

15%

6 months

18%

12 months

9%

DVLA advice post stroke or TIA: cannot drive for 1 month

Important for me Less important

A 52-year-old woman presents with a two week history of dizziness when she rolls over in bed. She says it feels like the room is spinning around her. Examination of her ears and cranial nerves is unremarkable. Given the likely diagnosis of benign paroxysmal positional vertigo what is the most appropriate management?

- ☐ Trial of prochlorperazine
- ☐ Request MRI brain
- ☐ Advise review by an optician
- ☐ Perform Epley manoeuvre
- ☐ Trial of cinnarizine

Trial of prochlorperazine

9%

Request MRI brain

4%

Advise review by an optician

4%

Perform Epley manoeuvre

75%

Trial of cinnarizine

8%

Which one of the following is least associated with normal pressure hydrocephalus?

- ☐ Papilloedema
- ☐ Dementia
- ☐ Urinary incontinence
- ☐ Gait abnormality
- ☐ Enlarged fourth ventricle

Papilloedema

59%

Dementia

12%

Urinary incontinence

8%

Gait abnormality

5%

Enlarged fourth ventricle

15%

Urinary incontinence + gait abnormality + dementia = normal pressure
hydrocephalus

Important for me Less important

A 36-year-old man with difficult to control epilepsy is reviewed in clinic. He is currently taking phenytoin but presents due to fatigue. A full blood count is performed:

Hb	10.1 g/dl
MCV	121 fl
Plt	$234 \times 10^9/l$
WCC	$4.6 \times 10^9/l$

What is the most likely cause for his tiredness?

- ☐ Iron deficiency
- ☐ Vitamin B12 deficiency
- ☐ Liver dysfunction secondary to phenytoin
- ☐ Haemolytic anaemia secondary to phenytoin
- ☐ Folate deficiency

Iron deficiency

4%

Vitamin B12 deficiency

29%

Liver dysfunction secondary to phenytoin

5%

Haemolytic anaemia secondary to phenytoin

6%

Folate deficiency

56%

A 34-year-old man who is known to suffer from complex partial seizures is reviewed in the neurology clinic. He has not been able to tolerate either carbamazepine or sodium valproate. What is the most appropriate next line drug?

- ☐ Phenytoin
- ☐ Lamotrigine
- ☐ Ethosuximide
- ☐ Topiramate
- ☐ Clonazepam

Phenytoin

12%

Lamotrigine

66%

Ethosuximide

11%

Topiramate

6%

Clonazepam

5%

A 25-year-old female presents 5 days after discharge from hospital following an admission for suspected meningitis. A lumbar puncture was performed which showed no evidence of infection. Unfortunately she developed a headache 48 hours after discharge. This has now lasted 3 days and has failed to settle with analgesia. Which one of the following treatment options should be considered?

- ☐ Intrathecal steroids
- ☐ Repeat lumbar puncture
- ☐ Course of oral prednisolone
- ☐ Blood patch
- ☐ Intravenous fluids on top of oral fluid intake

Intrathecal steroids

6%

Repeat lumbar puncture

6%

Course of oral prednisolone

10%

Blood patch

65%

Intravenous fluids on top of oral fluid intake

14%

A 60-year-old woman presents with a tremor. Which one of the following features would suggest a diagnosis of essential tremor rather than Parkinson's disease?

- ☐ Difficulty in initiating movement
- ☐ Tremor is worse following alcohol
- ☐ Postural instability
- ☐ Unilateral symptoms
- ☐ Tremor is worse when the arms are outstretched

Difficulty in initiating movement

4%

Tremor is worse following alcohol

10%

Postural instability

4%

Unilateral symptoms

7%

Tremor is worse when the arms are outstretched

75%

Difficulty in initiating movement (bradykinesia), postural instability and unilateral symptoms (initially) are typical of Parkinson's. Essential tremor symptoms are usually eased by alcohol.

A 27-year-old female presents complaining of generalised weakness. Examination of her face reveals bilateral ptosis, dysarthric speech and a slow-relaxing grip. What is the most likely diagnosis?

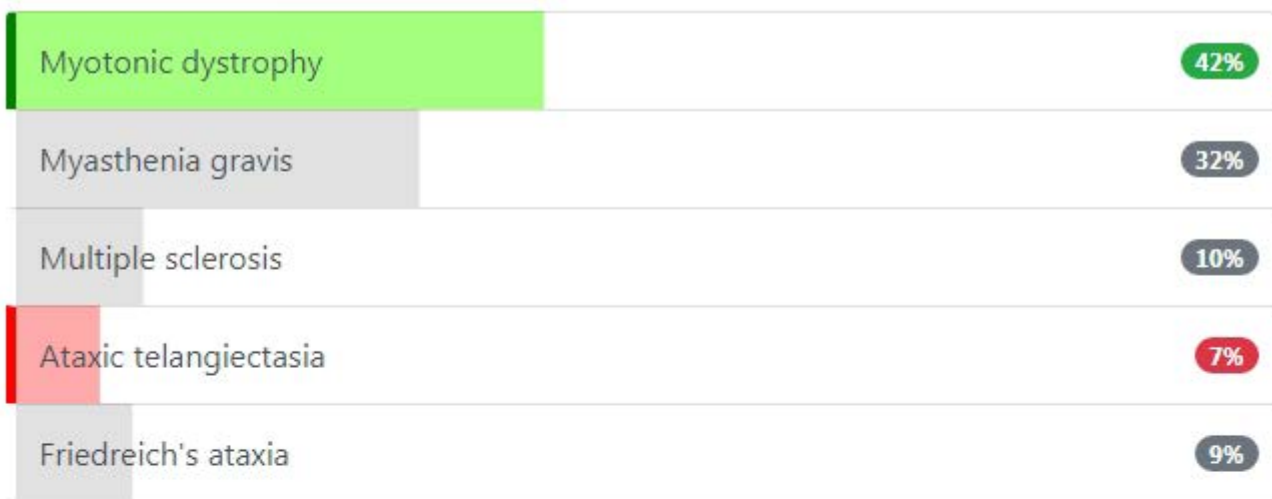
☐ Myotonic dystrophy

☐ Myasthenia gravis

☐ Multiple sclerosis

☐ Ataxic telangiectasia

☐ Friedreich's ataxia



Dystrophia myotonica - DM1

- **d**istal weakness initially
- autosomal **d**ominant
- **d**iabetes
- **d**ysarthria

Important for me Less important

The slow-relaxing grip may be noticed on initial hand-shake with the patient and is typical of myotonic dystrophy. Dysarthric speech is secondary to myotonia of the tongue and pharynx

A 59-year-old man is diagnosed with Parkinson's disease after being referred with a tremor and bradykinesia. His symptoms are now affecting his ability to work as an accountant and are having a general impact on the quality of his life. What treatment is he most likely to be offered initially?

- ☐ Levodopa
- ☐ MAO-B inhibitor
- ☐ COMT inhibitor
- ☐ Dopamine antagonist
- ☐ Dopamine agonist

Levodopa

61%

MAO-B inhibitor

7%

COMT inhibitor

5%

Dopamine antagonist

8%

Dopamine agonist

19%

Levodopa should be offered for patients with newly diagnosed Parkinson's who have motor symptoms affecting their quality of life

Important for me Less important

During a routine cranial nerve examination the following findings are observed:

Rinne's test:	Air conduction > bone conduction in both ears
Weber's test:	Localises to the right side

What do these tests imply?

- ☐ Left conductive deafness
- ☐ Normal hearing
- ☐ Right conductive deafness
- ☐ Right sensorineural deafness
- ☐ Left sensorineural deafness



In Weber's test if there is a sensorineural problem the sound is localised to the unaffected side (right) indicating a problem on the left side

A 62-year-old man with a history of hypertension and epilepsy is noted to have gingival hyperplasia on examination in the cardiology clinic. Which one of the following drugs is most likely to be responsible?

☐ Sodium valproate

☐ Lisinopril

☐ Atorvastatin

☐ Nifedipine

☐ Carbamazepine

Sodium valproate

36%

Lisinopril

6%

Atorvastatin

4%

Nifedipine

36%

Carbamazepine

19%

Gingival hyperplasia: phenytoin, ciclosporin, calcium channel blockers and AML

Important for me Less important

A 33-year-old male is admitted with a subacute headache, confusion, and nausea. On closer questioning, you note that this gentleman appears irritable, confused, and is hearing voices. Prior to this, his wife reports he has had a recent viral upper respiratory tract infection. He is otherwise fit and well and takes no regular medications.

On examination, you note that he is neglecting to use his right arm. He is otherwise, neurologically intact. A subsequent CT head reveals no space occupying lesion, infarct or bleed. Later, an MRI is performed which reveals bilateral asymmetric and poorly marginated hyperintense T2-weighted and FLAIR lesions within the subcortical white matter. A lumbar puncture reveals no oligoclonal bands in the CSF.

What is the likely underlying diagnosis?

- ☐ Alzheimer's disease
- ☐ Multiple sclerosis
- ☐ Meningitis
- ☐ Herpes simplex encephalitis
- ☐ Acute disseminated encephalomyelitis

Alzheimer's disease	3%
Multiple sclerosis	12%
Meningitis	3%
Herpes simplex encephalitis	39%
Acute disseminated encephalomyelitis	44%

The answer is acute disseminated encephalomyelitis which is a neurological condition which occurs typically a few weeks following a viral illness or vaccination. It can present with motor weakness, encephalopathy, seizures and coma. It is found on T2-weighted MRI imaging which reveals poorly-defined hyperintensities in the subcortical white matter. These lesions can develop throughout the course of the illness and hence serial MRIs may be required.

Multiple sclerosis is a differential diagnosis but is not necessarily definitively linked with a preceding illness. Alzheimer's disease and herpes encephalitis would not present with these MRI findings. The absence of prominent meningism features makes meningitis less likely.

Which one of the following is most associated with a good prognosis in Guillain-Barre syndrome?

- ☐ Age > 40 years
- ☐ Female sex
- ☐ No history of a diarrhoeal illness
- ☐ High anti-GM1 antibody titre
- ☐ Low peak expiratory flow rate

Age > 40 years	9%
Female sex	29%
No history of a diarrhoeal illness	40%
High anti-GM1 antibody titre	15%
Low peak expiratory flow rate	7%

Preceding gastrointestinal infections are associated with a poor prognosis in Guillain-Barre syndrome. The sex of the patient has not been shown to correlate with outcome

A 31-year-old man presents around four weeks after a non-specific viral illness characterised by fever, lethargy and sore throat. For the past week he has noticed increasing weakness in his legs which has now started to extend to his arms. On examination he has reduced power, reflexes and slightly reduced sensation in his lower limbs. A few days after admission he becomes short-of-breath. His forced vital capacity (FVC) starts to fall and he is transferred to ITU. Given the likely diagnosis, what is the treatment of choice

- ☐ Neostigmine
- ☐ Intravenous corticosteroids
- ☐ Haemofiltration
- ☐ Intravenous immunoglobulin
- ☐ Riluzole



This patient has developed Guillain-Barre syndrome (GBS) secondary to a viral illness, possibly the Epstein-Barr virus. The ascending weakness and areflexia point to a diagnosis of GBS.

A 26-year-old woman is recovering on the ward following a subarachnoid haemorrhage 6 days ago. She has been managing to maintain her oral fluid intake above 3 litres per day and her heart rate is 72 bpm at rest and her blood pressure is 146/88 mmHg at rest. Her fluid balance shows that she is net positive 650 ml over the last 6 days. Her daily bloods show the following:

Hb	134 g/l	Na ⁺	129 mmol/l
Platelets	253 * 10 ⁹ /l	K ⁺	4.1 mmol/l
WBC	5.1 * 10 ⁹ /l	Urea	2.3 mmol/l
Neuts	3.9 * 10 ⁹ /l	Creatinine	49 µmol/l
Lymphs	1.2 * 10 ⁹ /l	CRP	12.3 mg/l

Paired serum and urine samples shows the following:

Serum Osmolality	263 mosm/l	Urine Osmolality	599 mosm/l
Serum Na ⁺	129 mmol/l	Urine Na ⁺	63 mmol/l

What is the most likely cause for the patient's hyponatraemia?

- ☐ Cerebral salt-wasting syndrome
- ☐ Iatrogenic fluid overload
- ☐ Cranial diabetes insipidus
- ☐ Syndrome of inappropriate anti-diuretic hormone secretion (SIADH)
- ☐ Adrenal insufficiency

Cerebral salt-wasting syndrome	13%
Iatrogenic fluid overload	10%
Cranial diabetes insipidus	15%
Syndrome of inappropriate anti-diuretic hormone secretion (SIADH)	59%
Adrenal insufficiency	4%

SIADH is a common consequence of subarachnoid haemorrhage

Important for me [Less important](#)

The key to working out the cause here is looking at the paired serum and urine samples and the fluid status. The patient is haemodynamically stable and has a positive fluid balance which indicates the cause of the low sodium is unlikely to be diabetes insipidus or adrenal insufficiency as these cause fluid depletion. The high urine sodium indicates either excessive sodium loss or excessive water retention, were this iatrogenic then the urine would be as dilute as the serum.

Cerebral salt-wasting syndrome is known to occur following subarachnoid haemorrhage but the sodium loss is accompanied by water loss as the kidneys are still functioning normally so urine output is high and there is a relative fluid depletion. In SIADH the kidneys hold on to too much water, diluting the serum sodium and resulting in concentrated urine as in this case.

Which of the following visual field changes would be most consistent with a left parietal lobe lesion?

- ☐ Right homonymous hemianopia
- ☐ Left inferior homonymous quadrantanopia
- ☐ Left superior homonymous quadrantanopia
- ☐ Right superior homonymous quadrantanopia
- ☐ Right inferior homonymous quadrantanopia

Right homonymous hemianopia	5%
Left inferior homonymous quadrantanopia	13%
Left superior homonymous quadrantanopia	5%
Right superior homonymous quadrantanopia	10%
Right inferior homonymous quadrantanopia	67%

Visual field defects:

- left homonymous hemianopia means visual field defect to the left, i.e. lesion of right optic tract
- homonymous quadrantanopias: PITS (Parietal-Inferior, Temporal-Superior)
- incongruous defects = optic tract lesion; congruous defects = optic radiation lesion or occipital cortex

Important for me Less important

Which of the following features is least likely to be found in a patient with tuberous sclerosis?

☐ Adenoma sebaceum

☐ Cafe-au-lait spots

☐ Retinal hamartomas

☐ 'Ash-leaf' spots

☐ Lisch nodules

Adenoma sebaceum

10%

Cafe-au-lait spots

20%

Retinal hamartomas

10%

'Ash-leaf' spots

9%

Lisch nodules

50%

Lisch nodules are seen in neurofibromatosis

A 47-year-old female is reviewed in the neurology clinic. She was diagnosed with epilepsy whilst a teenager and her seizures are well controlled. She is however concerned about increasing numbness of her fingers and soles of her feet. Which one of the following medications is most likely to be responsible?

- ☐ Phenytoin
- ☐ Lamotrigine
- ☐ Sodium valproate
- ☐ Ethosuximide
- ☐ Levetiracetam

Phenytoin

60%

Lamotrigine

8%

Sodium valproate

21%

Ethosuximide

6%

Levetiracetam

5%

Peripheral neuropathy is a known adverse effect of phenytoin

Dr Assef

Neuropathic pain characteristically responds poorly to opioids. However, if standard treatment options have failed which opioid is it most appropriate to consider starting?

☐ Tramadol

☐ Morphine

☐ Codeine

☐ Oxycodone

☐ Buprenorphine

Tramadol

61%

Morphine

5%

Codeine

8%

Oxycodone

11%

Buprenorphine

15%

A 67-year-old man is reviewed in the falls clinic. Over the past few months he has sustained a number of falls. His daughter reports that he is starting to 'shuffle around the house' and has particular problems going up and down stairs. She also notes that he appears to be confused at times and often forgets his grandchildren's names.

On examination he appears to move and follow commands slowly. There is a resting tremor in the left hand more so than the right. Some rigidity is also noted when examining his arms. Examination of the cranial nerves is unremarkable other than a problem following movement in the vertical plane.

What is the most likely diagnosis?

- ☐ Parkinson's disease
- ☐ Motor neuron disease
- ☐ Multiple system atrophy
- ☐ Dementia with Lewy bodies
- ☐ Progressive supranuclear palsy



Progressive supranuclear palsy: parkinsonism, impairment of vertical gaze

Important for me Less important

A 62-year-old man presents with left-sided eye pain and diplopia for the past 2 days. Examination of his eyes shows his pupils equal and reactive to light with no proptosis. There is however an apparent palsy of the 6th cranial nerve associated with a partial 3rd nerve palsy on the left side. Examining the remaining cranial demonstrates hyperaesthesia of the upper face on the left side. Where is the likely lesion?

- ☐ Cavernous sinus
- ☐ Orbital apex
- ☐ Pons
- ☐ Cerebropontine angle
- ☐ Medulla

Cavernous sinus

49%

Orbital apex

8%

Pons

15%

Cerebropontine angle

22%

Medulla

6%

Dr Arsem

Cerebral palsy	4%
Charcot-Marie-Tooth	62%
Guillain Barre syndrome	5%
Mononeuritis multiplex	10%
Duchenne muscular dystrophy	20%

Charcot-Marie-Tooth is a cause for distal muscle wasting

Important for me [Less important](#)

This lady has features of distal muscle wasting and weakness; both features of Charcot-Marie-Tooth disease.

Cerebral palsy is a disorder of movement and coordination that appears in the first few years of life.

Guillain Barre Syndrome usually presents with an ascending weakness, with a history over days-weeks. Classically this occurs after a recent respiratory/GI infection.

Pain is a frequent symptom in Mononeuritis multiplex, often with both neuropathic pain within the area of sensory loss and a deep pain in the affected extremity.

Duchenne muscular dystrophy typically affects males, and only very rarely affects females.

A 28-year-old female has presented with symptoms of clumsiness, and has noticed that her legs are becoming an unusual shape. She states that the bottom of her legs around her ankles are becoming much thinner, and feel weaker over the past few months. She is quite concerned, as she is usually quite active and fit, and has never really had to come to the doctors before.

Which of the following is the most likely diagnosis?

- ☐ Cerebral palsy
- ☐ Charcot-Marie-Tooth
- ☐ Guillain Barre syndrome
- ☐ Mononeuritis multiplex
- ☐ Duchenne muscular dystrophy

What is the mechanism of action of sumatriptan?

- ☐ 5-HT3 agonist
- ☐ 5-HT2 antagonist
- ☐ 5-HT2 agonist
- ☐ 5-HT1 antagonist
- ☐ 5-HT1 agonist

5-HT₃ agonist

23%

5-HT₂ antagonist

15%

5-HT₂ agonist

16%

5-HT₁ antagonist

13%

5-HT₁ agonist

33%

Triptans are serotonin 5-HT_{1B} and 5-HT_{1D} receptor agonists

Important for me Less important

Triptans are specific agonists of 5-HT_{1B/1D} receptors.

A 43-year-old man is suspected of having a common peroneal nerve palsy following a fracture of his fibula. Each one of the following features may be seen in such lesions, except:

- ☐ Wasting of the anterior tibial and peroneal muscles
- ☐ Weakness of foot dorsiflexion
- ☐ Weakness of extensor hallucis longus
- ☐ Weakness of foot eversion
- ☐ Sensory loss over the medial aspect of the lower limb

Wasting of the anterior tibial and peroneal muscles	11%
Weakness of foot dorsiflexion	13%
Weakness of extensor hallucis longus	13%
Weakness of foot eversion	15%
Sensory loss over the medial aspect of the lower limb	49%

Sensory loss over the dorsum of the foot and the lower lateral part of the leg is seen in a common peroneal nerve palsy. The degree of wasting would of course depend on how long the nerve palsy had been present

Which one of the following is not a recognised causes of miosis?

- ☐ Old age
- ☐ Pontine haemorrhage
- ☐ Holmes-Adie pupil
- ☐ Argyll-Robertson pupil
- ☐ Horner's syndrome

Old age	15%
Pontine haemorrhage	8%
Holmes-Adie pupil	47%
Argyll-Robertson pupil	22%
Horner's syndrome	8%

Holmes-Adie pupil is a benign condition most commonly seen in women. It is one of the differentials of a dilated pupil

A 59-year-old female continues to have chronic neuropathic pain for 12 months following improvement of a dermatomal vesicular rash. She experiences minimal relief with paracetamol and NSAIDs. What is the next best treatment option?

- ☐ Sertraline
- ☐ Gabapentin
- ☐ Aciclovir
- ☐ Oxycontin
- ☐ Morphine

Sertraline	4%
Gabapentin	82%
Aciclovir	7%
Oxycontin	3%
Morphine	3%

Postherpetic neuralgia results from reactivation of the varicella-zoster virus acquired during the primary varicella infection, or chickenpox. Although postherpetic neuralgia is generally a self-limiting condition, it can last indefinitely and can be resistant to the usual pain medications. Anti-epileptic medications such as tricyclic antidepressants and gabapentin are useful in people with neurogenic pain. Tricyclics have a worse side effect profile compared to gabapentin.

A 58-year-old lady presents to clinic with a 6-month history of limb weakness and falls. She has hypercholesterolaemia and takes simvastatin.

On examination, there is wasting of the intrinsic hand muscles and left biceps with fasciculations in the left biceps and shoulder girdle. There is a generalised weakness with brisk left biceps and bilateral knee reflexes and a right extensor plantar response. The sensation is normal throughout. Examination of the cranial nerves was normal.

What is the most likely diagnosis?

- ☐ Compressive cervical myelopathy
- ☐ Motor neurone disease
- ☐ Multifocal motor neuropathy with conduction block
- ☐ Myopathy
- ☐ Myasthenia gravis

Compressive cervical myelopathy	19%
Motor neurone disease	51%
Multifocal motor neuropathy with conduction block	13%
Myopathy	10%
Myasthenia gravis	6%

The clinical description is a subacute progressive weakness with a mixture of lower and upper motor neurone signs without sensory involvement.

The diagnosis is motor neurone disease. You would suspect motor neurone disease in any patient with a mixture of lower and upper motor neurone signs without sensory involvement. Some pathologies can cause lower and upper motor neurone signs in different parts of the body (e.g. syringomyelia). The fact that these paradoxical signs co-exist in the same myotome clinches the diagnosis.

A cervical myelopathy would not cause lower motor neurone signs.

Multifocal motor neuropathy with conduction block, myopathy and myasthenia gravis would not cause upper motor neurone signs

A 34-year-old accountant presents with a one week history of pain around his right eye occurring once or twice a day. They are described as being very severe and lasting between 10-30 minutes each. He also describes a feeling of a blocked nose. What is the treatment of choice to treat this current episode?

- ☐ Ibuprofen
- ☐ Acetazolamide + topical pilocarpine
- ☐ Prednisolone
- ☐ Subcutaneous sumatriptan
- ☐ Ergotamine

Ibuprofen

13%

Acetazolamide + topical pilocarpine

11%

Prednisolone

6%

Subcutaneous sumatriptan

61%

Ergotamine

9%

Cluster headache - acute treatment: subcutaneous sumatriptan + 100% O₂

Important for me Less important

Standard analgesia is rarely effective in cluster headaches. 100% oxygen may also be used

What is the most common clinical pattern seen in motor neuron disease?

- ☐ Progressive muscular atrophy
- ☐ Progressive bulbar palsy
- ☐ Spinocerebellar ataxia
- ☐ Relapsing-remitting
- ☐ Amyotrophic lateral sclerosis

Progressive muscular atrophy

14%

Progressive bulbar palsy

6%

Spinocerebellar ataxia

3%

Relapsing-remitting

8%

Amyotrophic lateral sclerosis

67%

Which one of the following statements regarding absence seizures is **incorrect**?

- ☐ Typical age of onset of 3-10 years old
- ☐ Sodium valproate and ethosuximide are first-line treatments
- ☐ Seizures may be provoked by a child holding their breath
- ☐ There is a good prognosis
- ☐ Characteristic EEG changes are seen

Typical age of onset of 3-10 years old

9%

Sodium valproate and ethosuximide are first-line treatments

16%

Seizures may be provoked by a child holding their breath

51%

There is a good prognosis

7%

Characteristic EEG changes are seen

17%

Seizures are characteristically provoked by hyperventilation

Dr Assem

A 56-year-old gentleman presents with lower limb stiffness and imbalance. His only past medical history of note is carpal tunnel syndrome that was diagnosed a year ago on clinical grounds and has been refractory to treatment with splints and steroid injections. Which of the following is most likely?

- ☐ Cauda equina syndrome
- ☐ Subacute combined degeneration of the cord
- ☐ Degenerative cervical myelopathy
- ☐ Parkinsons disease
- ☐ Multiple sclerosis

Cauda equina syndrome	5%
Subacute combined degeneration of the cord	16%
Degenerative cervical myelopathy	64%
Parkinsons disease	5%
Multiple sclerosis	10%

The presentation of degenerative cervical myelopathy [DCM] is variable. Early symptoms are often subtle and can vary in severity day to day, making the disease difficult to detect initially. However as a progressive condition, worsening, deteriorating or new symptoms should be a warning sign.

Other answers:

- Cauda equina syndrome results from compression of the cauda equina and classically includes leg weakness, saddle anaesthesia and sphincter disturbance. It is usually an acute syndrome with progressive signs. It does not cause leg stiffness.
- Subacute combined degeneration of the cord results from long-standing vitamin B12 deficiency, classically presenting as a posterior cord syndrome with impaired proprioception. It can feature both upper and lower motor neuron signs. B12 deficiency can be associated with several neurological features. These include a myelopathy (classically the subacute combined degeneration of the cord), neuropathy and paraesthesias without neurological signs [3]. Subacute combined degeneration is extremely rare in developed countries, though in tropical countries it is frequently the commonest cause of non-traumatic myelopathy [4].
- Idiopathic Parkinsons disease is a tetrad of Tremor, Rigidity, Akinesia and Postural Instability (this can be remembered using the TRAP mnemonic). In the early stages pain is not a typical feature and it does not cause numbness.
- Multiple Sclerosis [MS] can have a variable presentation, with both sensory and motor symptoms and signs. Inflammatory changes are often present at multiple sites, which can cause symptoms at more than one site; a dissociated sensory loss, that is numbness at different and unlinked sites, is a hallmark of MS. Often patients will recall previous episodes of odd neurological deficits, which resolved. MS predominantly affects woman (3-4 times common) and usually presents before the age of 45.

References:

1. Baron EM, Young WF. Cervical spondylotic myelopathy: a brief review of its pathophysiology, clinical course, and diagnosis. *Neurosurgery*. 2007 Jan;60(1 Supp1):S35-41.
2. Behrbalk E, Salame K, Regev GJ, Keynan O, Boszczyk B, Lidar Z. Delayed diagnosis of cervical spondylotic myelopathy by primary care physicians. *Neurosurg Focus*. 2013 Jul;35(1):E1.
3. Kumar N1. Neurologic aspects of cobalamin (B12) deficiency. *Handb Clin Neurol*. 2014;120:915-26.
4. Pinto WB, de Souza PV, de Albuquerque MV, Dutra LA, Pedroso JL, Barsottini OG. Clinical and epidemiological profiles of non-traumatic myelopathies. *Arq Neuropsiquiatr*. 2016 Feb;74(2):161-5.

A 29-year-old man with a history of schizophrenia is taken to the local Emergency Department as he is generally unwell. He is currently taking olanzapine and citalopram. On examination he is noted to have a temperature of 37.0°C and his blood pressure is 170/100 mmHg. Which other examination finding would best support a diagnosis of neuroleptic malignant syndrome?

- ☐ Ataxia
- ☐ Hyperreflexia
- ☐ Muscle rigidity
- ☐ Tremor
- ☐ Papilloedema

Ataxia

4%

Hyperreflexia

14%

Muscle rigidity

71%

Tremor

5%

Papilloedema

5%

Dr. A. Sem

Which type of motor neuron disease carries the worst prognosis?

- ☐ Relapsing-remitting
- ☐ Progressive bulbar palsy
- ☐ Progressive muscular atrophy
- ☐ Spinocerebellar ataxia
- ☐ Amyotrophic lateral sclerosis

Relapsing-remitting

7%

Progressive bulbar palsy

49%

Progressive muscular atrophy

14%

Spinocerebellar ataxia

7%

Amyotrophic lateral sclerosis

24%

A 42-year-old woman presents as she has noticed a 'droop' in the right side of her face since she woke up this morning. There is no associated limb weakness, dysphagia or visual disturbance. On examination you notice right-sided upper and lower facial paralysis. Which one of the following features would be most consistent with a diagnosis of Bell's palsy?

- ☐ Vesicular rash around the ear
- ☐ Hyperacusis
- ☐ Sensory loss over the distribution of the facial nerve
- ☐ Pins and needles in the right arm
- ☐ Rhinorrhoea

Vesicular rash around the ear	13%
Hyperacusis	58%
Sensory loss over the distribution of the facial nerve	19%
Pins and needles in the right arm	4%
Rhinorrhoea	6%

A vesicular rash around the ear would suggest a diagnosis of Ramsey Hunt syndrome. Hyperacusis is seen in around a third of patients.

A 52-year-old old man who has a history of alcohol excess is brought to the Emergency Department by paramedics. He is a frequent attender and this time has a laceration on his scalp following a fall. Whilst examining him he seems confused and complains of problems with his vision. Which one of the following is the most commonly found ocular abnormality in patients with Wernicke's encephalopathy?

☐ Ophthalmoplegia

☐ Lateral rectus palsy

☐ Nystagmus

☐ Mydriasis

☐ Scotomata

Ophthalmoplegia

46%

Lateral rectus palsy

4%

Nystagmus

40%

Mydriasis

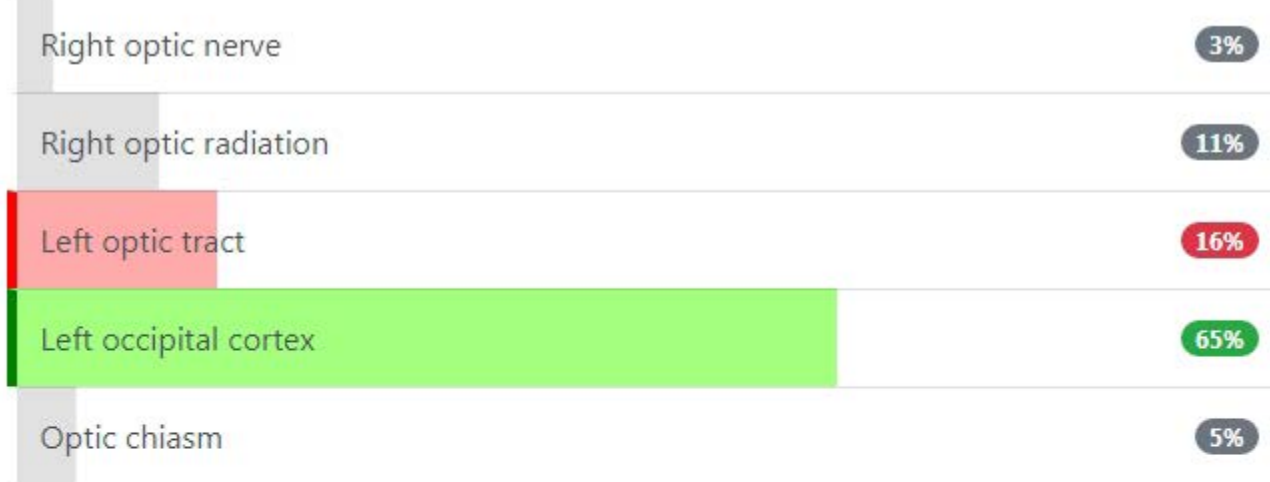
5%

Scotomata

5%

A 55-year-old man presents complaining of visual disturbance. Examination reveals a right congruous homonymous hemianopia with macula sparing. Where is the lesion most likely to be?

- ☐ Right optic nerve
- ☐ Right optic radiation
- ☐ Left optic tract
- ☐ Left occipital cortex
- ☐ Optic chiasm



Visual field defects:

- left homonymous hemianopia means visual field defect to the left, i.e. lesion of right optic tract
- homonymous quadrantanopias: PITS (Parietal-Inferior, Temporal-Superior)
- incongruous defects = optic tract lesion; congruous defects = optic radiation lesion or occipital cortex

A 69-year-old woman is brought to the emergency department with sudden onset unsteadiness. On examination she is haemodynamically stable, has normal visual fields, no ophthalmoplegia but a nystagmus which is present at rest, loss of pinprick sensation over the right trigeminal distribution but no facial weakness or loss of light touch sensation over the face. She also has loss of pinprick sensation in the left arm and leg although she has 5/5 power in all limbs and preserved light touch sensation in all dermatomes.

This clinical syndrome is most likely due to a stroke affecting which of the following vascular territories?

- ☐ Right posterior inferior cerebellar artery (PICA)
- ☐ Left posterior inferior cerebellar artery (PICA)
- ☐ Right anterior inferior cerebellar artery (AICA)
- ☐ Left anterior inferior cerebellar artery (AICA)
- ☐ Basilar artery

Right posterior inferior cerebellar artery (PICA)

52%

Left posterior inferior cerebellar artery (PICA)

15%

Right anterior inferior cerebellar artery (AICA)

19%

Left anterior inferior cerebellar artery (AICA)

6%

Basilar artery

8%

Lateral medullary syndrome can be caused by PICA strokes

Important for me Less important

Although this seems like an obscure presentation, the combination of facial and contralateral body loss of pain sensation along with nystagmus and ataxia make up a common syndrome called lateral medullary syndrome. It is an important syndrome to be aware of as it is most often due to a stroke affecting the posterior inferior cerebellar artery (PICA). It is the most commonly survived stroke that affects the brainstem and is commonly used as an exam question scenario. Given her symptoms, this would be in keeping with a right-sided posterior inferior cerebellar artery infarct.

An anterior inferior cerebellar artery infarct would present in the same way but with the additional symptoms of a same-sided facial weakness and loss of hearing. A basilar artery infarct would result in a locked-in syndrome where the patient is unable to move or communicate but is fully conscious. Both of these are more likely to affect the autonomic centres in the medulla and are associated with a higher mortality.

Dr. Assam

A 24-year-old female presents with a headache. She has a past history of epilepsy and is known to suffer from migraines, but has previously managed attacks with a combination of paracetamol and metoclopramide. This combination is however not working for the current episode.

What second line medication is it most appropriate to use?

- ☐ Codeine + paracetamol
- ☐ Pizotifen
- ☐ Zolmitriptan + paracetamol
- ☐ Methysergide
- ☐ Ergotamine

Codeine + paracetamol

7%

Pizotifen

7%

Zolmitriptan + paracetamol

72%

Methysergide

4%

Ergotamine

9%

Migraine

- acute: triptan + NSAID or triptan + paracetamol
- prophylaxis: topiramate or propranolol

Important for me Less important

Epilepsy is not a contraindication to the use of triptans. Opioids are not recommended in the management of migraine

You are asked to perform a neurological exam of the lower limbs on a patient with multiple sclerosis. Which one of the following findings is least typical?

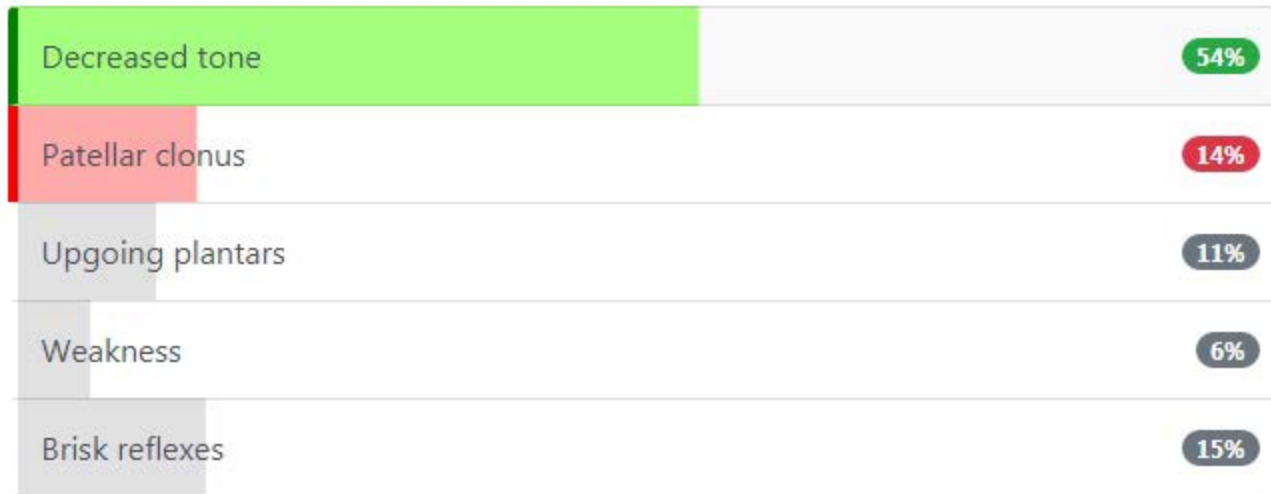
☐ Decreased tone

☐ Patellar clonus

☐ Upgoing plantars

☐ Weakness

☐ Brisk reflexes



In multiple sclerosis there is demyelination of the central nervous system and hence upper motor neuron signs are seen

You review a 65-year-old man who is currently taking antipsychotic medication. His carers have noticed that his movements have been very slow over the past few weeks. Which one of the following would suggest a diagnosis of Parkinson's disease rather than drug-induced parkinsonism?

- ☐ Rigidity
- ☐ Masked face
- ☐ Bilateral symptoms
- ☐ Flexed posture
- ☐ Restlessness of arms and legs



Rigidity and rest tremor are uncommon in drug-induced parkinsonism. Masked face and flexed posture can be seen in both conditions. Bilateral symptoms are more common in drug-induced parkinsonism. Restlessness of arms and legs (akathisia) is a common side-effect of antipsychotics.

A 78-year-old man is seen in the Memory clinic. His daughter reports that for the past 12 months he has become increasingly forgetful and has now started to wander around at night. A mini-mental test is performed and he scores 18 out of 30. Neurological examination is unremarkable. A full blood screen is also requested, all of which comes back as normal. What is the most appropriate next step?

- ☐ Arrange a MRI head
- ☐ Perform carotid Dopplers
- ☐ Give practical advice + advise family to contact Alzheimer's Society
- ☐ Prescribe aspirin + simvastatin
- ☐ Prescribe donepezil

Arrange a MRI head

45%

Perform carotid Dopplers

3%

Give practical advice + advise family to contact Alzheimer's Society

18%

Prescribe aspirin + simvastatin

3%

Prescribe donepezil

32%

Neuroimaging is required to diagnose dementia

Important for me Less important

A 31-year-old woman presents with a 4 month history of headache. She has brought a headache diary which demonstrates that her symptoms are present on around 20-25 days of each month. The headache is typically unilateral and she is currently taking paracetamol 1g qds and ibuprofen 400mg tds everyday to try and relieve her symptoms. A diagnosis of medication overuse headache is suspected. What is the most appropriate management?

- ☐ Add metoclopramide + start propranolol
- ☐ Gradually withdraw analgesics + start propranolol
- ☐ Abruptly stop analgesics
- ☐ Gradually withdraw analgesics
- ☐ Continue analgesics + start propranolol

Add metoclopramide + start propranolol

5%

Gradually withdraw analgesics + start propranolol

29%

Abruptly stop analgesics

34%

Gradually withdraw analgesics

27%

Continue analgesics + start propranolol

5%

Medication overuse headache

- simple analgesia + triptans: stop abruptly
- opioid analgesia: withdraw gradually

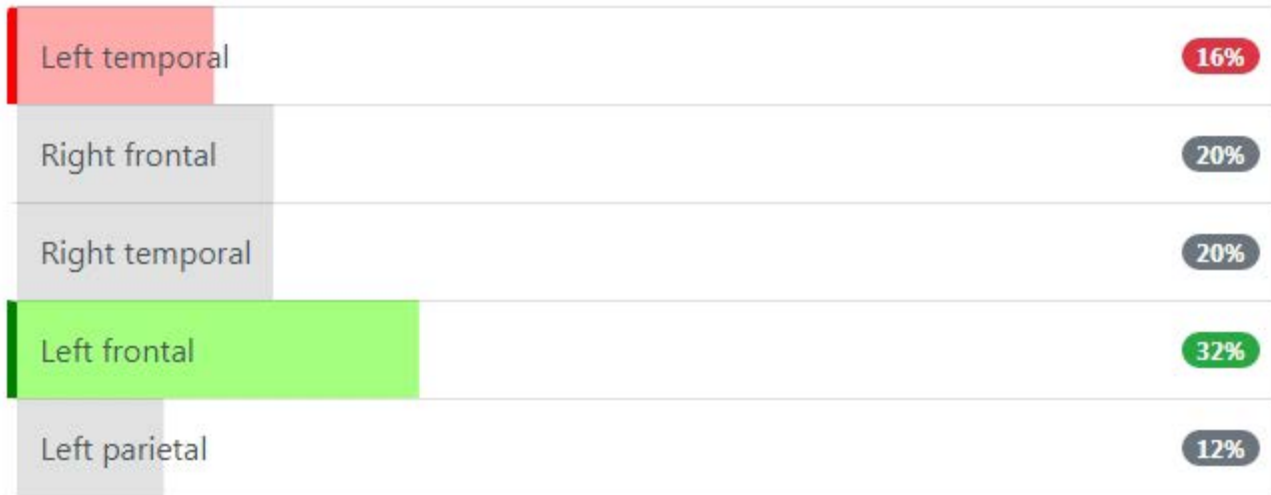
Important for me Less important

This answer may seem counterintuitive but it is line with recent guidelines from SIGN, please see the link provided.

A 65-year-old gentleman is admitted to the medical take with a progressively worsening headache for 3 weeks. On closer questioning, he reveals it is worse first thing in the morning but also exacerbated by recumbency and coughing. He is also complaining of intermittent visual disturbances and on fundoscopic examination, there is papilloedema of the right disc but optic atrophy on the left.

A subsequent CT scan is performed revealing a space occupying lesion. Where is the space occupying lesion most likely situated?

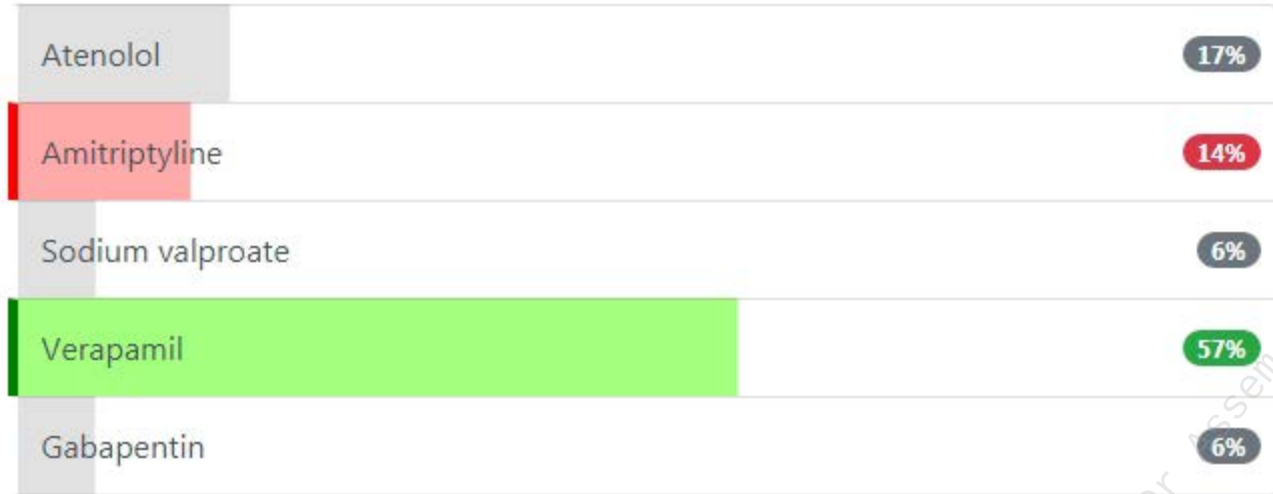
- ☐ Left temporal
- ☐ Right frontal
- ☐ Right temporal
- ☐ Left frontal
- ☐ Left parietal



This is an interesting case of Foster-Kennedy syndrome. This syndrome reflects a frontal lobe tumour - usually a meningioma in this age group - leading to ipsilateral optic atrophy and papilloedema of the contralateral optic nerve. The reason for the optic atrophy is as a result of direct damage from the space occupying lesion. Other causes are AVMs and juvenile nasopharyngeal angiofibroma.

A 39-year-old man is diagnosed as having cluster headaches. He has received subcutaneous sumatriptan on two occasions but would like to start medication to help prevent further attacks. Of the following options, which one is the most suitable treatment?

- ☐ Atenolol
- ☐ Amitriptyline
- ☐ Sodium valproate
- ☐ Verapamil
- ☐ Gabapentin



A 65-year-old man who is known to have metastatic colorectal cancer presents for review. Since last been seen he reports being generally stiff and on examination is noted to have diffuse hypertonia. Which antibodies are most likely to be responsible for this presentation?

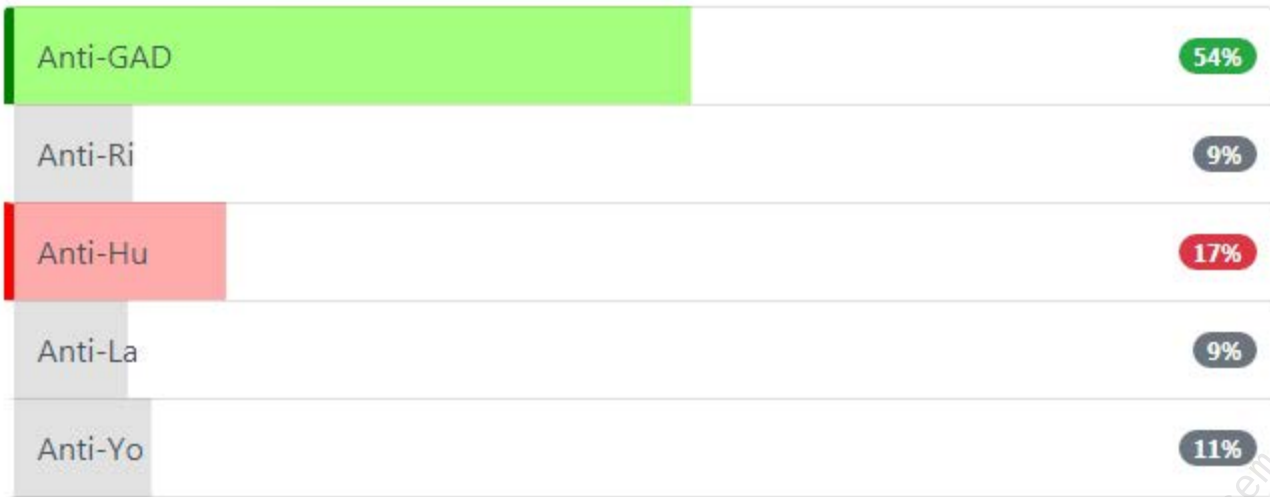
☐ Anti-GAD

☐ Anti-Ri

☐ Anti-Hu

☐ Anti-La

☐ Anti-Yo

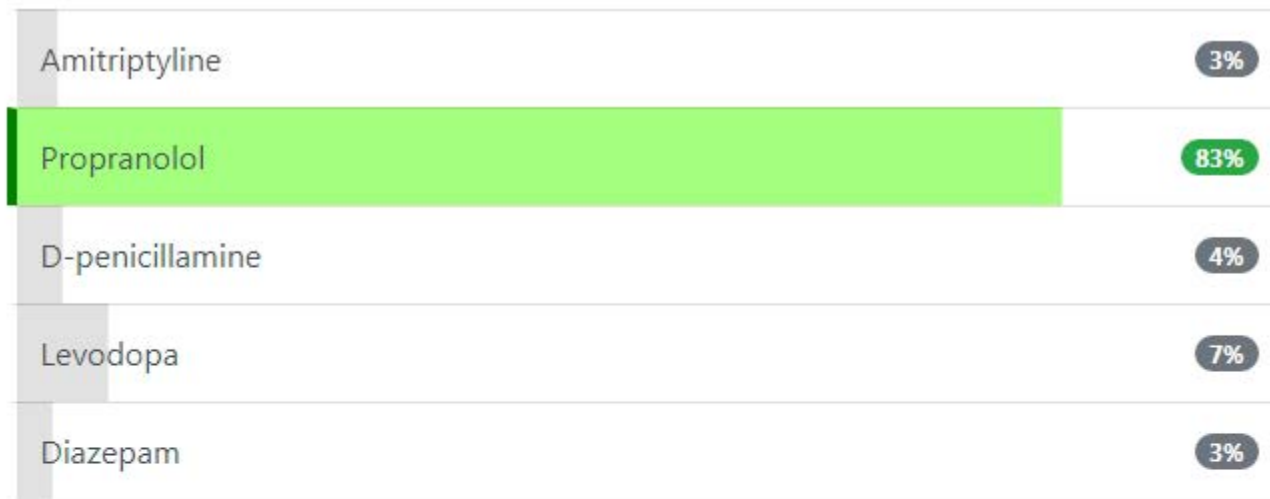


This patient has developed stiff person's syndrome.

Dr Assem

A 54-year-old man presents with a persistent tremor. On examination there is 6-8 Hz tremor of the arms which is worse when his arms are outstretched. His father suffered from a similar complaint. What is the most suitable first-line treatment?

- ☐ Amitriptyline
- ☐ Propranolol
- ☐ D-penicillamine
- ☐ Levodopa
- ☐ Diazepam



Essential tremor is an AD condition that is made worse when arms are outstretched, made better by alcohol and propranolol

Important for me Less important

This patient has a typical history of essential tremor. Propranolol is generally considered the first-line treatment

A 55-year-old female is admitted with a seizure. The seizure fails to respond to repeated dose of intravenous lorazepam. You decide to try a second line agent. Shortly after administration of the drug the patients blood pressure drops to 75/45 mmHg.

What drug is most likely implicated?

☐ Sodium valproate

☐ Carbamazepine

☐ Lamotrigine

☐ Phenytoin

☐ Levetiracetam

Sodium valproate	10%
Carbamazepine	6%
Lamotrigine	7%
Phenytoin	69%
Levetiracetam	9%

Intravenous phenytoin can cause hypotension

Important for me [Less important](#)

Intravenous phenytoin can cause hypotension and bradyarrhythmias. Phenytoin is believed to protect against seizures by causing voltage-dependent block of voltage gated sodium channels. Phenytoin is also a class IB antiarrhythmic drugs which blocks sodium channels in the heart resulting in shortening of repolarization.

Dr. Arjun

A 12-year-old boy is brought to the Emergency Department. He was hit on the side the head by a cricket ball during a match. His teacher describes him initially collapsing to the ground and complaining of a sore head. After two minutes he got up, said he felt OK and continued playing. After 30 minutes he suddenly collapsed to the ground and lost consciousness. What type of injury is he most likely to have sustained?

- ☐ Cerebral contusion
- ☐ Subarachnoid haemorrhage
- ☐ Intraventricular haemorrhage
- ☐ Extradural haematoma
- ☐ Subdural haematoma

Cerebral contusion

3%

Subarachnoid haemorrhage

5%

Intraventricular haemorrhage

2%

Extradural haematoma

73%

Subdural haematoma

16%

Head injury, lucid interval - extradural (epidural) haematoma

Important for me

Less important

Which one of the following anti-epileptic drugs is most likely to cause visual field defects?

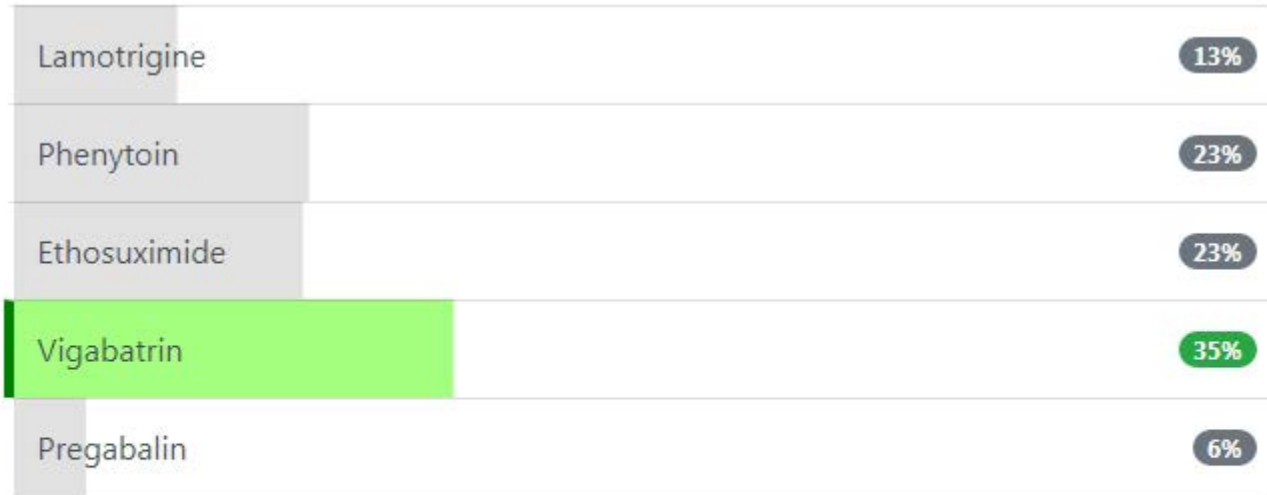
☐ Lamotrigine

☐ Phenytoin

☐ Ethosuximide

☐ Vigabatrin

☐ Pregabalin



V for Vigabatrin - V for Visual field defects

Important for me Less important

A 24-year-old woman who is 14 weeks pregnant presents with a severe migraine. She has a long history of migraine and stopped propranolol prophylaxis when she found out she was pregnant. Unfortunately the headache has not responded to paracetamol 1g. What is the most appropriate next step?

- ☐ Ergotamine
- ☐ Nasal zolmitriptan
- ☐ Ibuprofen 400mg
- ☐ Almotriptan 12.5mg
- ☐ Codeine 30mg

Ergotamine

9%

Nasal zolmitriptan

28%

Ibuprofen 400mg

38%

Almotriptan 12.5mg

14%

Codeine 30mg

12%

A 73-year-old female with a history of recurrent falls at home and alcohol excess is brought to the Emergency Department due to episodes of confusion over the past 5 days. Between these episodes she is apparently her normal self. On examination her GCS is 14/15 and she has nystagmus on left lateral gaze. What is the most likely diagnosis?

- ☐ Subdural haemorrhage
- ☐ Subarachnoid haemorrhage
- ☐ Meningitis
- ☐ Herpes simplex encephalitis
- ☐ Alzheimer's disease

Subdural haemorrhage

77%

Subarachnoid haemorrhage

9%

Meningitis

3%

Herpes simplex encephalitis

6%

Alzheimer's disease

5%

Fluctuating consciousness = subdural haemorrhage

Important for me Less important

The combination of falls, alcohol excess, fluctuating episodes of confusion and focal neurology points towards a diagnosis of subdural haemorrhage. The phrase 'fluctuating conscious level' is common in questions and should always bring to mind subdural haemorrhage

Dr Assem

Which one of the following causes of peripheral neuropathy is most associated with an axonal, rather than demyelinating, pathology?

- ☐ Paraprotein neuropathy
- ☐ Guillain-Barre syndrome
- ☐ Hereditary sensorimotor neuropathies (HSMN) type I
- ☐ Amiodarone
- ☐ Vasculitis

Paraprotein neuropathy

12%

Guillain-Barre syndrome

11%

Hereditary sensorimotor neuropathies (HSMN) type I

28%

Amiodarone

17%

Vasculitis

32%

The other causes are associated with a demyelinating pathology

A 22-year-old man was seen in the Emergency Department after his mother reported three separate seizure episodes. He was unable to remember what happened and was unaware anything was happening at the time. His mother describes the episodes lasting 30 seconds each and no obvious trigger. She reported that he lost consciousness and began chewing and licking his top lip, but did not have any limb movements or incontinence. She also said that after each episode he struggled to 'find his words' for at least a minute.

What type of seizure and localising lobe does the above description correspond most to?

- ☐ Focal awareness impaired, parietal lobe
- ☐ Focal aware, frontal lobe
- ☐ Focal awareness impaired, frontal lobe
- ☐ Focal awareness impaired, temporal lobe
- ☐ Focal aware, temporal lobe

Focal awareness impaired, parietal lobe	14%
Focal aware, frontal lobe	3%
Focal awareness impaired, frontal lobe	32%
Focal awareness impaired, temporal lobe	47%
Focal aware, temporal lobe	3%

Lip smacking + post-ictal dysphasia are localising features of a temporal lobe seizure

Important for me Less important

A new classification for seizures has replaced the following terms:

Simple partial = focal aware

Complex partial = focal awareness impaired

In this case the seizure is focal awareness impaired from the history.

The localising features of lip-smacking and post-ictal speech problems point towards the temporal lobe

<https://www.epilepsy.com/article/2016/12/2017-revised-classification-seizures>

Dr Assem

Each of the following are causes of peripheral neuropathy. Which one is associated with predominately sensory loss?

- ☐ Diphtheria
- ☐ Hereditary sensorimotor neuropathies
- ☐ Porphyria
- ☐ Lead poisoning
- ☐ Uraemia

Diphtheria

8%

Hereditary sensorimotor neuropathies

19%

Porphyria

14%

Lead poisoning

24%

Uraemia

35%

Which one of the following features is most associated with parietal lobe lesions?

- ☐ Gerstmann's syndrome
- ☐ Perseveration
- ☐ Cortical blindness
- ☐ Superior homonymous quadrantanopia
- ☐ Wernicke's aphasia

Gerstmann's syndrome

59%

Perseveration

12%

Cortical blindness

6%

Superior homonymous quadrantanopia

9%

Wernicke's aphasia

15%

Parietal lobe lesions may cause Gerstmann's syndrome

Important for me

Less important

An obese 24-year-old female presents with headaches and blurred vision. Examination reveals bilateral blurring of the optic discs but is otherwise unremarkable with no other neurological signs. Blood pressure is 130/74 and she is afebrile. What is the most likely underlying diagnosis?

- ☐ Multiple sclerosis
- ☐ Meningococcal meningitis
- ☐ Brain abscess
- ☐ Normal pressure hydrocephalus
- ☐ Idiopathic intracranial hypertension

Multiple sclerosis

8%

Meningococcal meningitis

3%

Brain abscess

3%

Normal pressure hydrocephalus

10%

Idiopathic intracranial hypertension

76%

Obese, young female with headaches / blurred vision think idiopathic intracranial hypertension

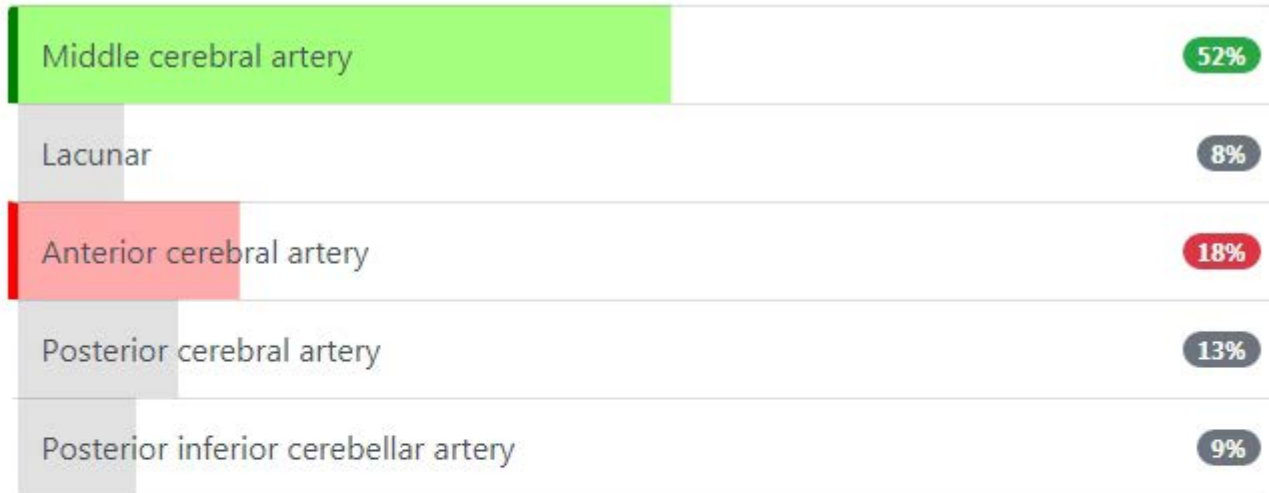
Important for me ~~Less important~~

The combination of a young, obese female with papilloedema but otherwise normal neurology makes idiopathic intracranial hypertension the most likely diagnosis

Dr Assem

You review a 70-year-old woman four days after she was admitted with a suspected stroke. Unfortunately she has been left with right sided sensory loss affecting her arms more than the legs and a right sided homonymous hemianopia. Functionally she has difficulty dressing her self. Examination of her cranial nerves is unremarkable. What area is the stroke most likely to have affected?

- ☐ Middle cerebral artery
- ☐ Lacunar
- ☐ Anterior cerebral artery
- ☐ Posterior cerebral artery
- ☐ Posterior inferior cerebellar artery



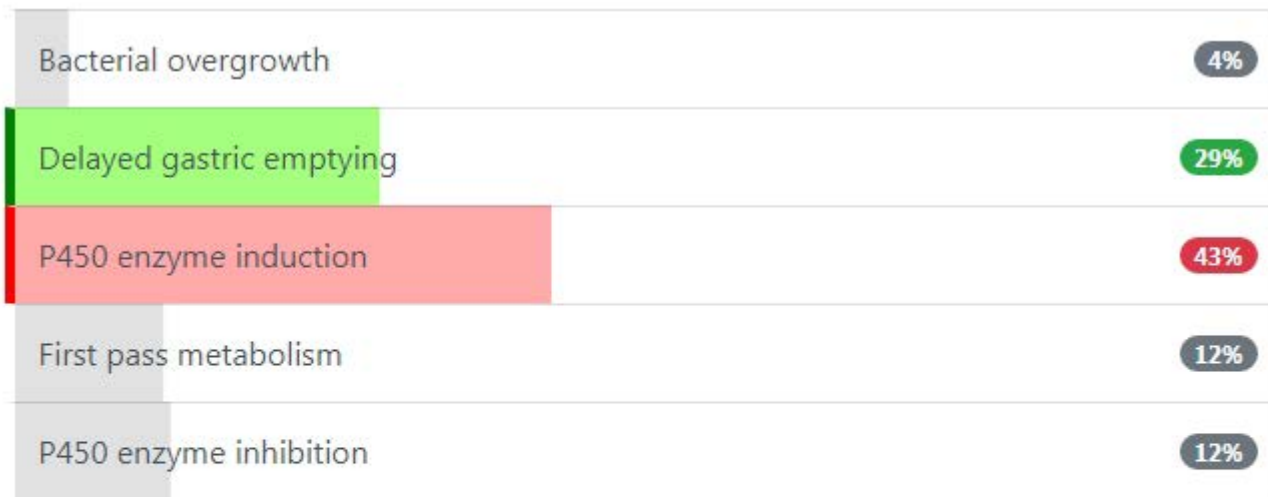
Contralateral hemiparesis and sensory loss with the upper extremity being more affected than the lower, contralateral homonymous hemianopia and aphasia - middle cerebral artery

Important for me Less important

A 34-year-old man with a history of migraine finds that paracetamol taken at the recommend dose often fails to relieve his acute attacks. He drinks 12 units of alcohol per week and smokes 15 cigarettes per day.

What factor is likely to contribute to this problem?

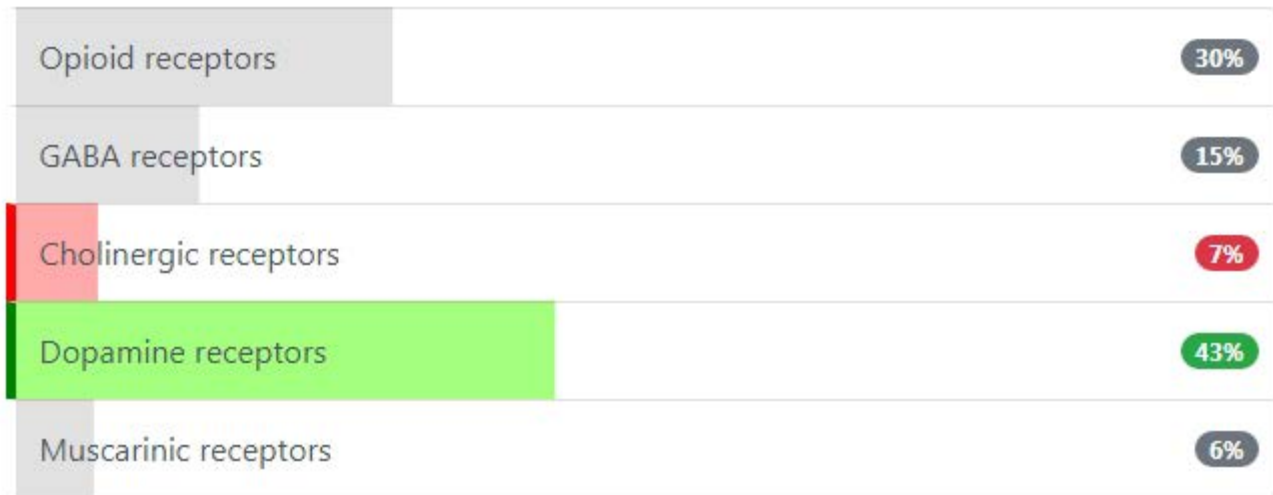
- ☐ Bacterial overgrowth
- ☐ Delayed gastric emptying
- ☐ P450 enzyme induction
- ☐ First pass metabolism
- ☐ P450 enzyme inhibition



Patients with migraine experience delayed gastric emptying during acute attacks. For this reason analgesics are often combined prokinetic agents such as metoclopramide. Paracetamol metabolism would not be significantly affected by changes in P450 enzyme activity (e.g. through smoking or drinking)

A 52-year-old man is prescribed apomorphine. What type of receptors does apomorphine act on?

- ☐ Opioid receptors
- ☐ GABA receptors
- ☐ Cholinergic receptors
- ☐ Dopamine receptors
- ☐ Muscarinic receptors



Apomorphine - dopamine receptor agonist

Important for me Less important

Apomorphine is one of the older dopamine receptor agonists. Newer agents such as ropinirole and cabergoline have since been developed

A 25-year-old man presents for review. For the past year he has been experiencing headaches. These are now occurring around 5-6 times per month and typically 'last all day' when they occur. They are not associated with any form of aura. A typical headache is described as a severe throbbing on both sides of his head associated with nausea and lethargy. When he gets such a headache he typically goes to bed so he can 'sleep it off' as activity such as walking or climbing the stairs makes it worse. Before going to bed he typically takes one of his father's diclofenac tablets which seem to help.

Neurological examination is unremarkable.

What is the most likely diagnosis?

- ☐ Migraine
- ☐ Cluster headache
- ☐ Medication-overuse headache
- ☐ Tension headache
- ☐ Raised intracranial pressure

Headache Type	Percentage
Migraine	43%
Cluster headache	11%
Medication-overuse headache	18%
Tension headache	21%
Raised intracranial pressure	7%

Migraine

43%

Cluster headache

11%

Medication-overuse headache

18%

Tension headache

21%

Raised intracranial pressure

7%

This headache is very likely to represent a migraine. Much of the history is very typical, except that the majority of patients usually have unilateral symptoms.

There is no evidence of the kind of medication overuse that can result in regular headaches.

Which one of the following medications is most useful for helping to prevent attacks of Meniere's disease?

- ☐ Promethazine
- ☐ Prochlorperazine
- ☐ Betahistine
- ☐ Chlorphenamine
- ☐ Cinnarizine

Promethazine

9%

Prochlorperazine

22%

Betahistine

54%

Chlorphenamine

5%

Cinnarizine

11%

A 52-year-old man with a history of epilepsy is reviewed. Since having his medication change he has experienced a 'numbness' of his hands and feet. On examination he has reduced sensation in a glove-and-stocking distribution associated with a reduced ankle reflex. He is also noted to have lymphadenopathy in the cervical and inguinal region and some bleeding around the gums. Which one of the following medications is he most likely to have been taking?

- ☐ Carbamazepine
- ☐ Phenytoin
- ☐ Topiramate
- ☐ Sodium valproate
- ☐ Lamotrigine

Carbamazepine

7%

Phenytoin

73%

Topiramate

4%

Sodium valproate

11%

Lamotrigine

5%

Which of the following investigations is the most important for diagnosing degenerative cervical myelopathy?

- ☐ Nerve conduction studies and EMG
- ☐ MRI Cervical spine
- ☐ CT myelogram
- ☐ CT C-spine
- ☐ AP and lateral C-spine radiographs

Nerve conduction studies and EMG	6%
MRI Cervical spine	83%
CT myelogram	5%
CT C-spine	3%
AP and lateral C-spine radiographs	3%

An MRI of the cervical spine is the gold standard test where cervical myelopathy is suspected. It may reveal disc degeneration and ligament hypertrophy, with accompanying cord signal change.

Other answers:

- CT imaging is reserved for patients with contraindications to magnetic resonance imaging. A CT myelogram is the first line investigation in this case.
- Radiographs are not clinically useful in the workup of these patients, though osteoarthritic changes (e.g. osteophytes) can be visible if they are performed.
- Other investigations (e.g. nerve conduction studies, EMG) may be performed when the clinical picture is unclear. These can help to exclude mononeuropathies and other lower motor neuron disorders. However, where there is strong clinical suspicion and the diagnosis is suspected, an MRI of the cervical spine should be performed.

A 62-year-old man is seen in the rapid access transient ischaemic attack clinic following three episodes over the past two weeks of transient left sided weakness. What is the most appropriate advice to give with regards to driving?

- ☐ Cannot drive for 12 months
- ☐ Cannot drive until investigations complete
- ☐ Inform DVLA but can continue driving
- ☐ Cannot drive for 3 months
- ☐ Cannot drive for 1 month

Cannot drive for 12 months

17%

Cannot drive until investigations complete

23%

Inform DVLA but can continue driving

5%

Cannot drive for 3 months

30%

Cannot drive for 1 month

25%

DVLA advice post multiple TIAs: cannot drive for 3 months

Important for me

Less important

A 55-year-old man is diagnosed with amyotrophic lateral sclerosis. Which one of the following drugs has been shown to confer a survival benefit?

- ☐ Rituximab
- ☐ Riluzole
- ☐ Interferon-beta
- ☐ Cyclophosphamide
- ☐ Interferon-alpha

Rituximab

6%

Riluzole

65%

Interferon-beta

15%

Cyclophosphamide

4%

Interferon-alpha

10%

Motor neuron disease - riluzole

Important for me Less important

Which one of the following factors indicates a poor prognosis in patients with multiple sclerosis?

- ☐ Relapsing-remitting disease
- ☐ Presence of sensory symptoms
- ☐ Young age of onset
- ☐ Male sex
- ☐ Long interval between first two relapses

Relapsing-remitting disease

12%

Presence of sensory symptoms

10%

Young age of onset

33%

Male sex

39%

Long interval between first two relapses

5%

A 43-year-old woman with multiple sclerosis presents for review. She is having increasing problems with painful involuntary contractions of the leg muscles. What is the most appropriate first-line therapy?

- ☐ Referral for relaxation therapy
- ☐ Baclofen
- ☐ Diazepam
- ☐ Dantrolene
- ☐ Natalizumab

Referral for relaxation therapy

7%

Baclofen

67%

Diazepam

8%

Dantrolene

12%

Natalizumab

6%

A 37-year-old female patient is brought into the emergency department with a 5-day history of altered personality, visual and auditory hallucinations. On palpation of the abdomen, a mass is felt in the left iliac fossa. Ultrasound abdomen suggests a left ovarian tumour. Her basic observations are as follows:

Oxygen saturation	99% on air
Heart rate	98 beats/minute
Respiratory rate	28 breaths/minute
Temperature	37.9 °C

What is the most likely diagnosis?

- ☐ Meningitis
- ☐ Anti-NMDA receptor encephalitis
- ☐ Rabies
- ☐ Japanese encephalitis
- ☐ Mania

Meningitis	6%
Anti-NMDA receptor encephalitis	68%
Rabies	5%
Japanese encephalitis	12%
Mania	8%

Anti-NMDA receptor encephalitis is a paraneoplastic syndrome which presents with prominent psychiatric features

Important for me [Less important](#)

Anti-NMDA receptor encephalitis is a paraneoplastic syndrome which presents with prominent psychiatric features. In this case, it is likely caused by an ovarian tumour.

Meningitis does not usually present with prominent psychiatric features

Rabies can present with psychiatric symptoms, but it usually presents with hypersalivation of hydrophobia which is not the feature here.

Japanese encephalitis is less likely with no clear travel history given and does not usually present with such prominent psychiatric symptoms.

The patient presents with symptoms of psychosis but no suggestion of mood disturbance hence mania is unlikely. Given the finding of an ovarian tumour and abnormality in her vital signs, an organic illness needs to be ruled out before psychiatric illness can be diagnosed.

Which one of the following is least associated with the development of chorea?

- ☐ Haemochromatosis
- ☐ Ataxic telangiectasia
- ☐ Carbon monoxide poisoning
- ☐ SLE
- ☐ Huntington's disease

Haemochromatosis

39%

Ataxic telangiectasia

16%

Carbon monoxide poisoning

19%

SLE

22%

Huntington's disease

4%

A 40-year-old man presents with a progressive deterioration in vision over the past 2 weeks. On examination, there is ophthalmoplegia, his gait is noticeably ataxic and there is a generalised loss of the deep tendon reflexes. He returned from Turkey two weeks ago where he describes having a simple viral illness involving a sore throat and fever that lasted for around 1 week and resolved shortly before his return home. He drank more alcohol than normal during the holiday, having around 3 glasses of wine each night. What is the cause of his poor vision?

- ☐ Guillain-Barre syndrome
- ☐ Acute motor axonal neuropathy
- ☐ Chronic inflammatory demyelinating polyneuropathy
- ☐ Alcoholic polyneuropathy
- ☐ Miller-Fisher variant

Guillain-Barre syndrome	13%
Acute motor axonal neuropathy	6%
Chronic inflammatory demyelinating polyneuropathy	6%
Alcoholic polyneuropathy	7%
Miller-Fisher variant	68%

Miller-Fisher variant is a type of Guillain-Barre syndrome that starts by affecting the cranial nerves and therefore manifests with eye signs. Both Guillain-Barre syndrome and Miller-Fisher tend to be preceded by an infection, classically *Campylobacter jejuni*.

Ophthalmoplegia, areflexia and ataxia (of which the question has all three) are the major features of Miller-Fisher.

This alcohol consumption is a distractor as the question states he drank much more than usual this week and alcoholic polyneuropathy only comes from a chronic, heavy alcohol history.

A 62-year-old man is referred to the neurology clinic with worsening symptoms over the past few months. The neurologist suspects the patient has progressive supranuclear palsy. Which one of the following features is least likely to be seen in this patient?

- ☐ Poor response to L-dopa
- ☐ Impairment of horizontal gaze
- ☐ Falls
- ☐ Cognitive impairment
- ☐ Slurring of speech



Progressive supranuclear palsy: parkinsonism, impairment of vertical gaze

Important for me Less important

Impairment of vertical gaze is seen in progressive supranuclear palsy. Horizontal gaze impairment is sometimes seen later as the disease progresses, but would be atypical in a newly diagnosed patient.

Dr Assem

You are working on the stroke ward. A 69-year-old lady has come in following a sudden onset of dizziness and visual disturbances which started yesterday morning. She initially thought she was just dehydrated however later realised she was unable to read her own shopping list. On the ward round the consultant examines her and finds she is indeed unable to read. She is however, able to write. When she writes a sentence it makes perfect sense, although she is again unable to read it out. She has no problems with her speech, and is able to converse completely normally. She has no motor focal neurological deficit. The consultant asks you where the lesion is likely to be?

- ☐ Corpus callosum
- ☐ Wernicke's area
- ☐ Right (non-dominant) parietal lobe
- ☐ Left frontal lobe
- ☐ Broca's area

Corpus callosum	26%
Wernicke's area	18%
Right (non-dominant) parietal lobe	27%
Left frontal lobe	9%
Broca's area	20%

The scenario here is alexia (inability to read), without agraphia (inability to write). This occurs because of an infarction of the left posterior cerebral artery which perfuses the splenium of the corpus callosum and left visual (occipital) cortex. Although it is a rare condition, it is one of the disconnect syndromes associated with lesions of the corpus callosum.

Because the left visual cortex is damaged by the stroke, only the right visual cortex can process information. However because there has been an infarction in the corpus callosum information cannot be transmitted from the right hemisphere to the left hemisphere. Therefore it is not able to reach the Wernicke's and Broca's areas in the left (dominant) hemisphere.

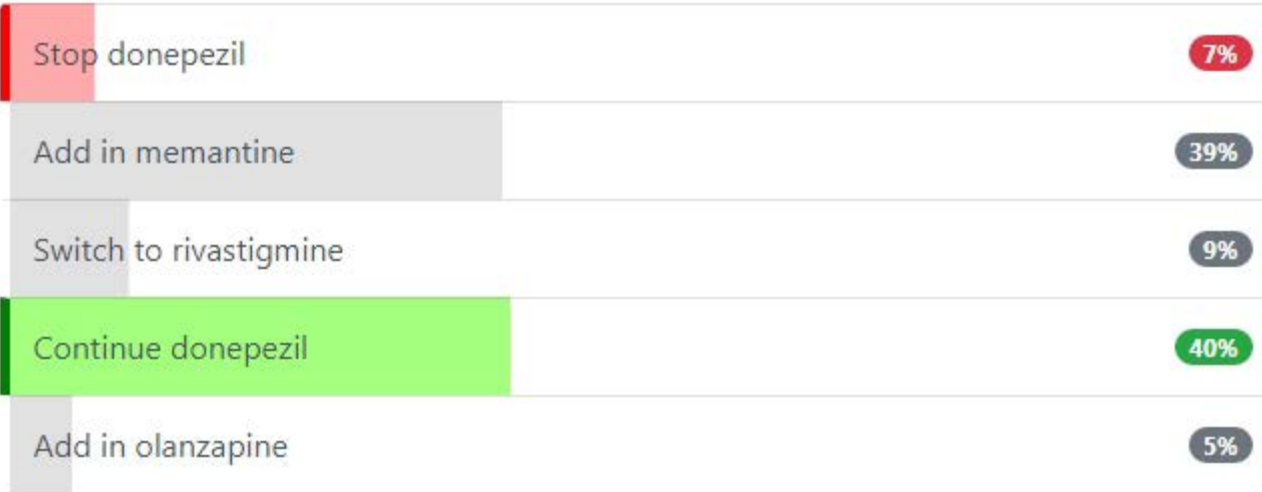
Speech is unaffected as Broca's area remains intact and can transmit information to the primary motor cortex. The ability to write is likewise unaffected as the Wernicke's and Broca's areas can still transmit information to the primary motor cortex.

There are many disconnect syndromes from lesions of the corpus callosum, the eponym for this one being 'Dejerine syndrome'.

A 78-year-old gentleman presents to the memory clinic accompanied by his wife. He is pleasantly confused. His wife reports he is still coping at home fairly independently, although she does have to remind him of things more frequently. He has a known diagnosis of Alzheimer's disease and was started on donepezil and successfully up-titrated to the maximum therapeutic dose. Cognitive testing reveals his mini mental test score to be 21/30. Six months previously his score was 24/30.

What is the most appropriate management?

- ☐ Stop donepezil
- ☐ Add in memantine
- ☐ Switch to rivastigmine
- ☐ Continue donepezil
- ☐ Add in olanzapine



NICE guidelines do not support the use of memantine in mild dementia

Important for me Less important

Despite evidence of a small cognitive decline, this gentleman still has 'mild' dementia as reflected by his MMSE and the fact he is coping at home. He has no evidence of significant behavioural or psychological symptoms. As such, continuing donepezil (which he is tolerating) would be the most appropriate answer. A cognitive decline despite initiation of donepezil would be expected due to the progressive nature of the disease. There is no evidence in this case to support switching to an alternative acetylcholinesterase inhibitor (e.g. rivastigmine) unless there is another reason to do so (e.g. rivastigmine comes in a patch form for those unable to swallow). NICE does not recommend stopping acetylcholinesterase inhibitors on the basis of disease severity alone. Memantine is only recommended in moderate and severe alzheimer's disease. There is no role for an anti-psychotic in this case.

A 23-year-old man with a history of migraine presents for review. His headaches are now occurring about once a week. He describes unilateral, throbbing headaches that may last over 24 hours. Neurological examination is unremarkable. Other than a history of asthma he is fit and well. What is the most suitable therapy to reduce the frequency of migraine attacks?

- ☐ Propranolol
- ☐ Zolmitriptan
- ☐ Topiramate
- ☐ Amitriptyline
- ☐ Pizotifen

Propranolol	21%
Zolmitriptan	13%
Topiramate	54%
Amitriptyline	7%
Pizotifen	5%

Migraine

- acute: triptan + NSAID or triptan + paracetamol
- prophylaxis: topiramate or propranolol

Important for me Less important

Pizotifen is used less commonly nowadays due to side-effects such as weight gain.
Propranolol should be avoided in asthmatics.

A 45-year-old lady presents with a 2-month history of left-hand weakness. She has no past medical history. On examination, there is a mild weakness of the left upper and lower limbs with a right sided facial weakness which spares the forehead. Where is the lesion?

- ☐ Right cerebrum
- ☐ Left cerebrum
- ☐ Right pons
- ☐ Left pons
- ☐ Cervical spinal cord

Right cerebrum	36%
Left cerebrum	7%
Right pons	40%
Left pons	10%
Cervical spinal cord	7%

This is a fairly challenging localisation question but is perhaps not as difficult as it first seems if you work through the possibilities and eliminate options as you go.

A right cerebral lesion would give left upper and lower limb weakness. It would also cause a left sided facial weakness

A left cerebral lesion would give right upper and lower limb weakness with right facial weakness

A cervical spinal cord lesion would not cause a facial weakness

We are left with the pons. The pons is above the level of decussation of the corticospinal tracts so a pontine lesion would cause a contralateral limb weakness. Based on this information alone you can conclude that option 3 must be the correct answer without needing to understand why it has caused an ipsilateral facial weakness

The facial motor nucleus is located in the pons and supplies the ipsilateral facial muscles

The difference between an upper and lower motor neuron CN7 lesion is not discussed here but is worth learning

Which one of the following statements regarding restless legs syndrome is **incorrect**?

- ☐ Movements may be seen during sleep
- ☐ May be secondary to uraemia
- ☐ Affects approximately 5% of the general population
- ☐ Family history is found in up to 50% of patients
- ☐ It is three times as common in females

Movements may be seen during sleep

16%

May be secondary to uraemia

11%

Affects approximately 5% of the general population

12%

Family history is found in up to 50% of patients

17%

It is three times as common in females

44%

Males and females are thought to be equally affected, with only one study showing a slightly increased incidence in females

A 29-year-old female with progressive dementia and myoclonus is seen in the memory clinic. On examination, the patient has marked myoclonus with impairment of the concentration and memory aspects of the Addenbrooke's test. An MRI reveals a 'hockey stick sign'. A few weeks later the patient develops akinetic mutism and paresis of vertical upgaze. What is the likely diagnosis given the clinical and radiological findings?

- ☐ Progressive supranuclear palsy
- ☐ Variant Creutzfeldt-Jakob disease
- ☐ Lewy body dementia
- ☐ Wilson's disease
- ☐ Huntington's disease

Progressive supranuclear palsy	23%
Variant Creutzfeldt-Jakob disease	59%
Lewy body dementia	5%
Wilson's disease	5%
Huntington's disease	9%

This is a case of variant Creutzfeldt-Jakob disease (vCJD). The typical presentation is that of a younger patient with progressive dementia (less rapid than the sporadic CJD) with myoclonus and, in the later stages, mutism and vertical upgaze palsy (found in 50%). An MRI brain reveals a characteristic 'hockey stick sign' where the pulvinar region and dorsomedial thalamus are hyperintense on T2-weighted imaging (or pulvinar sign where the pulvinar region is hyperintense only). CSF protein for 14-3-3 and periodic sharp wave complexes on the EEG are more commonly seen in sporadic CJD.

Wilson's disease often has extrapyramidal signs with other features such as liver disease and Kayser-Fleischer rings. Progressive supranuclear palsy would present with a downgaze vertical gaze palsy more commonly and Lewy body dementia would have more Parkinsonian features. There is no obvious family history of Huntington's here and there would be caudate atrophy on the MRI.

You are asked to see a 21-year-old woman on the medical take who presents with a 2-day history of blurred vision and pain in her right eye which worsened after her morning bath. She had similar symptoms 6 months ago affecting her right eye but these resolved spontaneously and she did not seek medical attention. Examination reveals a central scotoma and impaired colour vision on Ishihara plates in the right eye. Examination is otherwise unremarkable. A contrast MRI brain shows T2 enhancement of the right optic nerve but no other abnormalities. Lumbar puncture demonstrates oligoclonal bands in the cerebrospinal fluid (CSF). Her mother has multiple sclerosis (MS) and she is understandably anxious to discuss her diagnosis and treatment options. Which of the following is the most appropriate action?

- ☐ Start Beta-interferon
- ☐ Reassure her she does not have MS and discharge
- ☐ Give steroids and arrange MRI whole spine
- ☐ Perform visual evoked potentials
- ☐ Give steroids and arrange repeat MRI brain as a neurology outpatient

Start Beta-interferon	15%
Reassure her she does not have MS and discharge	3%
Give steroids and arrange MRI whole spine	47%
Perform visual evoked potentials	11%
Give steroids and arrange repeat MRI brain as a neurology outpatient	25%

Multiple sclerosis diagnosis that requires demyelinating lesions that are separated in space and time

Important for me Less important

The diagnosis of multiple sclerosis requires the identification of demyelinating lesions that are separated in space and time. The question is trying to lure you into making a diagnosis of MS but pay attention to the details and don't be fooled- on the evidence provided you cannot demonstrate that lesions are separated in BOTH space and time and so you can't diagnose MS.

She currently has optic neuritis affecting the right eye. This is supported by the MRI brain showing a demyelinating lesion of the right optic nerve. From her history it's likely she has had a previous episode of right-sided optic neuritis. So she has disease separated in time but so far not space. Oligoclonal bands in the CSF help support a diagnosis of MS but aren't diagnostic and still don't show dissemination in space. For this she would need to have a contrast-enhanced MRI spine. This could show old plaques/active demyelination; that would confirm disease disseminated in time AND space and so allow a diagnosis of MS.

Giving steroids to treat her optic neuritis can shorten the duration of the attack and improve recovery so it's appropriate to start them.

1 - Beta-interferon is used in certain MS patients who meet specific criteria. It reduces the frequency of attacks. It is inappropriate to start in this scenario as you are not even able to confirm a diagnosis of MS

2 - You cannot exclude MS with the information available and so it would be wrong (and frankly negligent) to reassure and discharge her (on the basis of probability it's very likely that she has/will develop MS in the future but again on the limited information you have available you can't make that diagnosis).

3 - This is the best option. By doing an MRI spine you can determine if there are lesions separated in space and time. Steroids would treat her current optic neuritis

4. Visual evoked potentials are used in investigating MS but wouldn't add anything in this scenario. You already know she has optic neuritis and the MRI brain has shown a demyelinating lesion.

5 - Giving steroids would help her current optic neuritis but simply repeating the MRI brain at a later date is inappropriate

A 76-year-old woman is diagnosed with Alzheimer's disease. Which one of the following could be a contraindication to the prescription of donepezil?

- ☐ History of depression
- ☐ Sick sinus syndrome
- ☐ Concurrent simvastatin therapy
- ☐ Concurrent citalopram therapy
- ☐ Ischaemic heart disease

History of depression

12%

Sick sinus syndrome

42%

Concurrent simvastatin therapy

6%

Concurrent citalopram therapy

11%

Ischaemic heart disease

30%

Donepezil may cause bradycardia and atrioventricular node block.

Dr Assem

A 45-year-old male presents to the acute medical take with a three day history of progressive bilateral leg weakness. Which of the following constellation of signs on examination is the most consistent with a diagnosis of Guillain-Barre Syndrome?

- ☐ Bradycardia with lower limb hyporeflexia and flaccid paralysis
- ☐ Tachycardia with lower limb hyporeflexia and spastic paralysis
- ☐ Bradycardia with lower limb hyperreflexia and spastic paralysis
- ☐ Tachycardia with lower limb hyporeflexia and flaccid paralysis
- ☐ Tachycardia with lower limb hyperreflexia and flaccid paralysis

Bradycardia with lower limb hyporeflexia and flaccid paralysis	36%
Tachycardia with lower limb hyporeflexia and spastic paralysis	5%
Bradycardia with lower limb hyperreflexia and spastic paralysis	7%
Tachycardia with lower limb hyporeflexia and flaccid paralysis	46%
Tachycardia with lower limb hyperreflexia and flaccid paralysis	6%

Absent or depressed deep tendon reflexes are classical findings in Guillain-Barre Syndrome (GBS). Hyperreflexia is seen in a GBS variant known as Bickerstaff's encephalitis.

The paralysis in GBS is flaccid.

Autonomic symptoms are common in GBS. The most frequently encountered are tachycardia and urinary retention. Although autonomic dysfunction may manifest as hypertension, hypotension, bradycardia, or ileus, these are not as commonly seen.

You are examining a patient who complains of double vision. Whilst looking forward the patient's right eye turns downwards and outwards. On attempting to look to the patient's left the patient is unable to adduct the right eye and double vision worsens. On looking right the angle of the squint is less. What is the most likely underlying problem?

- ☐ Left 3rd nerve palsy
- ☐ Left 6th nerve palsy
- ☐ Right 3rd nerve palsy
- ☐ Right 4th nerve palsy
- ☐ Right 6th nerve palsy

Left 3rd nerve palsy

11%

Left 6th nerve palsy

7%

Right 3rd nerve palsy

53%

Right 4th nerve palsy

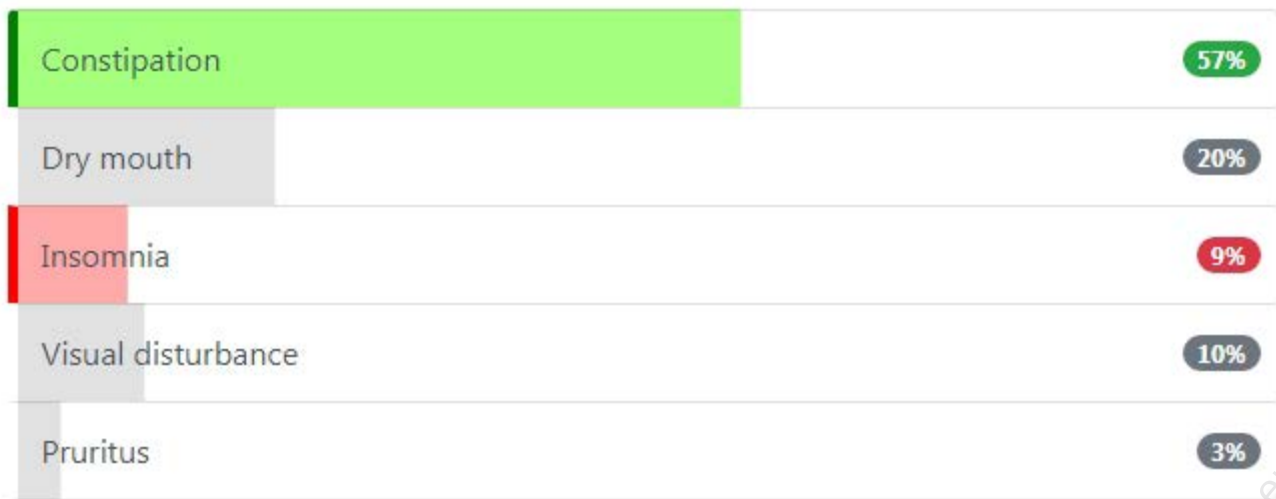
19%

Right 6th nerve palsy

11%

A patient is given ondansetron for chemotherapy related nausea. What is the most likely side-effect?

- ☐ Constipation
- ☐ Dry mouth
- ☐ Insomnia
- ☐ Visual disturbance
- ☐ Pruritus



Whilst all the above may occur constipation is most common

A 19-year-old presents as she would like to start a combined oral contraceptive pill. During the history she states that in the past she has had migraine with aura. She asks why the combined oral contraceptive pill is contraindicated. What is the most appropriate response?

- ☐ Theoretical risk of ischaemic stroke
- ☐ Significantly increased risk of ischaemic stroke
- ☐ Increased frequency of migraines
- ☐ Migraine is an independent risk factor for venous thromboembolism
- ☐ Increased severity of migraines

Theoretical risk of ischaemic stroke

13%

Significantly increased risk of ischaemic stroke

50%

Increased frequency of migraines

15%

Migraine is an independent risk factor for venous thromboembolism

12%

Increased severity of migraines

10%

A 29-year-old female has just given birth a baby boy who weighs 3.1kg. The baby unfortunately develops bleeding via the umbilicus, mucous membranes, gastrointestinal tract. The mother has a past medical history of epilepsy.

What anti-epileptic is most likely implicated?

☐ Sodium valproate

☐ Carbamazepine

☐ Lamotrigine

☐ Levetiracetam

☐ Phenytoin

Sodium valproate	24%
Carbamazepine	12%
Lamotrigine	8%
Levetiracetam	6%
Phenytoin	50%

Phenytoin induces vitamin K metabolism, which can cause a relative vitamin K deficiency, creating the potential for hemorrhagic disease of the newborn

Important for me Less important

Phenytoin induces vitamin K metabolism, which can cause a relative vitamin K deficiency, creating the potential for hemorrhagic disease of the newborn. The most common sites of bleeding are the umbilicus, mucous membranes, gastrointestinal tract, and venepunctures.

Sodium valproate causes a 20-fold increase in neural tube defects.

Carbamazepine also increases the risk of neural tube defects.

Recent studies have shown that lamotrigine and levetiracetam do not significantly increase risk of birth defects during pregnancy.

A 35-year-old gentleman presents to general practice with neck swelling. He denies any other lumps and has no B symptoms. He has no significant past medical history and is on no medications.

On examination, you note a 5.5cm smooth and regular swelling in the anterior cervical lymph node chain. There is no other neck, groin, or axillary lymphadenopathy. There is no hepatosplenomegaly. Blood tests are all unremarkable.

He is thereafter referred for an ultrasound guided biopsy which reveals the presence of abnormal follicles with atrophic and hyalinized germinal centres surrounded by prominent mantle zones containing small lymphocytes. What is the most likely underlying condition?

- ☐ Cat scratch fever
- ☐ Myeloma
- ☐ Hodgkins lymphoma
- ☐ Unicentric Castleman's disease
- ☐ HIV lymphadenitis

Cat scratch fever	9%
Myeloma	4%
Hodgkins lymphoma	26%
Unicentric Castleman's disease	53%
HIV lymphadenitis	8%

Unicentric Castleman's disease is a lymphoproliferative disorder associated in a subset of cases with HIV and HHV-8. Patient's with unicentric Castleman's disease tend to be asymptomatic and lymphadenopathy is constrained to one lymph node group. The most common sites of the disease being the chest (24 percent), neck (20 percent), abdomen (18 percent), and retroperitoneum (14 percent). Biopsy of the lymph node commonly shows regressed germinal centres surrounded by prominent mantle zones.

Here, there is no contact history with cats to suggest cat scratch fever. There is no history of HIV although multiple sites of lymphadenopathy could be caused by this infectious disease. Myeloma would include mention of a paraproteinaemia with plasma cells present on the biopsy with evidence of organ involvement. This biopsy result is not consistent with Hodgkin's lymphoma and there are no B symptoms.

A 70 year old man has decompressive surgery for degenerative cervical myelopathy. Three years later he presents with neck pain and hand paraesthesias. Which one of the following management strategies is recommended?

- ☐ Trial of neuropathic analgesia and cervical nerve root injections
- ☐ Investigate with nerve conduction studies and EMG in the first instance
- ☐ Urgent AP/lateral cervical spine radiographs as an MRI scan is contraindicated
- ☐ Urgent referral to spinal surgery or neurosurgery
- ☐ Refer to physiotherapy services

Trial of neuropathic analgesia and cervical nerve root injections	8%
Investigate with nerve conduction studies and EMG in the first instance	8%
Urgent AP/lateral cervical spine radiographs as an MRI scan is contraindicated	7%
Urgent referral to spinal surgery or neurosurgery	70%
Refer to physiotherapy services	7%

Postoperatively, patients with cervical myelopathy require ongoing follow-up as pathology can 'recur' at adjacent spinal levels, which were not treated by the initial decompressive surgery.

Recurrent symptoms should be treated with a high degree of suspicion. Although peripheral neuropathy can occur in any patient, this should not be the diagnosis that is the most strongly suspected as delays in diagnosis and treatment of DCM affect outcomes. Therefore, B is false.

All patients with recurrent symptoms should be evaluated urgently by specialist spinal services (A and E, false). Axial spine imaging is necessary and a MRI scan is first line. In patients unable to have a MRI, CT or CT myelogram may be considered. AP and lateral radiographs are of limited use when myelopathy is suspected (C, false).

References

1. Kong L, Cao J, Wang L, Shen Y. Prevalence of adjacent segment disease following cervical spine surgery: A PRISMA-compliant systematic review and meta-analysis. *Medicine (Baltimore)*. 2016 Jul;95(27):e4171.

A 71-year-old man is admitted to the Emergency Department. His family report that since yesterday he has been very 'clumsy' and unsteady on his feet. This morning he started to complain of numbness down his left side. On examination you notice that he has a right-sided Horner's syndrome and horizontal nystagmus. Examination of the peripheral nervous system confirms the sensory loss on the left side. Where is the lesion most likely to be?

- ☐ Lateral sinus thrombosis
- ☐ Posterior cerebral artery
- ☐ Posterior inferior cerebellar artery
- ☐ Middle cerebral artery
- ☐ Anterior inferior cerebellar artery

Lateral sinus thrombosis

8%

Posterior cerebral artery

9%

Posterior inferior cerebellar artery

57%

Middle cerebral artery

10%

Anterior inferior cerebellar artery

15%

A 76-year-old man presents to the Emergency Department, this is his 5th attendance in 2 months. His past medical history includes hypertension, hypercholesterolaemia and chronic alcohol use. You have never seen him and prior to entering the cubicle the registrar tells you to give his usual treatment of fluids, Pabrinex and discharge back home. You manage to take a minimal history from the patient but he denies falling or a history of head trauma. You examine him as best you can. He has an ataxic gait, horizontal nystagmus and dysmetria.

What is an important cause of his symptoms not to be missed?

- ☐ Alcohol withdrawal
- ☐ Extradural haemorrhage
- ☐ Subdural haemorrhage
- ☐ Vestibular neuronitis
- ☐ Cerebellar stroke

Alcohol withdrawal	12%
Extradural haemorrhage	7%
Subdural haemorrhage	22%
Vestibular neuronitis	8%
Cerebellar stroke	51%

Cerebellar stroke patients can present like they are 'drunk'

Important for me Less important

Patients with cerebellar strokes can present like they are drunk and those with alcohol misuse this diagnosis can be missed.

Alcohol withdrawal can range from mild, moderate and severe/delirium tremens depending on the symptoms. Mild to moderate withdrawal may start as early as 4 to 6 hours after the last drink, and peak at 24 to 36 hours. Severe withdrawal symptoms occur after 24 hours and usually peak at day 2. Delirium tremens generally occurs after 3 days of abstinence or decreased drinking.

Vestibular neuronitis is characterised by acute, spontaneous, and prolonged vertigo, commonly after a viral infection. Hearing loss and tinnitus are not features but may be present in labyrinthitis.

Extradural and subdural haemorrhage may be present. Extradural haemorrhages usually present with a history of trauma, like a blow to the pterion impacting on the middle meningeal artery. Subdural haemorrhages are seen in patients with chronic alcohol intake and the elderly and may present with a reduced GCS or confusion, particularly if they are on anticoagulants.

A 45-year-old female with a past medical history of asthma is diagnosed as having essential tremor. What is the most suitable management?

- ☐ Amitriptyline
- ☐ Propranolol
- ☐ Sodium valproate
- ☐ Carbamazepine
- ☐ Primidone



Essential tremor is an AD condition that is made worse when arms are outstretched, made better by alcohol and propranolol

Important for me Less important

Propranolol is generally considered first-line in essential but given the history of asthma primidone should be used

A 19-year-old woman presents to her General Practitioner with a bilateral sensorineural hearing loss. An MRI brain is requested and it reveals what are likely to be bilateral vestibular schwannomas.

What neurocutaneous syndrome is the patient very likely to have?

- ☐ Sturge Weber syndrome
- ☐ Von Hippel Lindau syndrome
- ☐ Tuberous sclerosis
- ☐ Neurofibromatosis type 1
- ☐ Neurofibromatosis type 2

Sturge Weber syndrome	6%
Von Hippel Lindau syndrome	7%
Tuberous sclerosis	7%
Neurofibromatosis type 1	11%
Neurofibromatosis type 2	69%

Neurofibromatosis type 2 is associated with bilateral vestibular schwannomas

Important for me [Less important](#)

Neurofibromatosis type 2 is a rare neurocutaneous syndrome. A classical feature includes bilateral vestibular schwannomas (previously known as acoustic neuromas), which present as a sensorineural hearing loss. Patients may have multiple schwannomas, meningiomas and ependymomas of the brain or spine. Other findings include retinal hamartomas, cataracts, Cafe Au Lait markings and peripheral nerve tumours.

Neurofibromatosis type 1, also known as von Recklinghausen disease, does not typically feature bilateral vestibular schwannomas. The typical features are Cafe au Lait spots, axillary freckling, Lisch nodules, neurofibromas and optic nerve gliomas.

Von Hippel Lindau syndrome is a condition featuring visceral cysts and benign tumours in any system, including the brain. It is not associated with bilateral vestibular schwannomas.

Tuberous sclerosis is a rare genetic disorder due to mutation of either the TSC1 or TSC2 genes. Its features are multiple central nervous system hamartomas (tubers), subependymal giant cell astrocytomas of the brain, kidneys angiomyolipomas, cardiac rhabdomyomas, facial angiofibromas, Shagreen patches and retinal astrocytic hamartomas.

Sturge Weber syndrome characterised by a 'port-wine stain' of the forehead, learning disabilities, seizures and glaucoma.



Discuss (1)

Improve

A 24-year-old lady presents with a two-week history of frontal headache associated with blurred vision and nausea. She has a history of asthma and acne. She uses a salbutamol inhaler as needed, a topical retinoid and is halfway through a three-month course of doxycycline. On examination, she has no neurological deficits but is noted to have bilateral gross papilloedema. Her body mass index is 26kg/m². A CT scan shows no hydrocephalus or mass lesions.

Which of the following is the most likely cause of her symptoms?

- ☐ Migraine
- ☐ Retinoid use
- ☐ Venous sinus thrombosis
- ☐ Subarachnoid haemorrhage
- ☐ Tetracycline use

Migraine	8%
Retinoid use	25%
Venous sinus thrombosis	27%
Subarachnoid haemorrhage	5%
Tetracycline use	36%

This patient has symptoms and signs consistent with idiopathic intracranial hypertension. This condition is known to be associated with tetracycline use.

Explanation for other options:

- 1. The finding of bilateral papilloedema is not consistent with a history of migraines.
- 2. Retinoids are not associated with raised intracranial hypertension.
- 3. Venous sinus thrombosis is a possible cause of these symptoms but would usually have some focal neurological signs, and the history of tetracycline use makes idiopathic intracranial hypertension more likely.
- 4. Subarachnoid haemorrhage tends to present with a sudden onset 'thunderclap headache' rather than this patient's more gradual symptoms.

A patient is referred due to the development of a third nerve palsy associated with a headache. On examination meningism is present. Which one of the following diagnoses needs to be urgently excluded?

- ☐ Weber's syndrome
- ☐ Internal carotid artery aneurysm
- ☐ Multiple sclerosis
- ☐ Posterior communicating artery aneurysm
- ☐ Anterior communicating artery aneurysm

Weber's syndrome

14%

Internal carotid artery aneurysm

20%

Multiple sclerosis

7%

Posterior communicating artery aneurysm

44%

Anterior communicating artery aneurysm

16%

Painful third nerve palsy = posterior communicating artery aneurysm

Important for me Less important

Given the combination of a headache and third nerve palsy it is important to exclude a posterior communicating artery aneurysm

A 28-year-old woman with a history of systemic lupus erythematosus (SLE) presents with jerky, irregular movements which seem to move from one limb to another. Her symptoms are continuous and there are no other neurological features such as impairment of consciousness. Where is the neurological lesion most likely to be?

- ☐ Cerebellum
- ☐ Temporal lobe
- ☐ Hippocampus
- ☐ Thalamus
- ☐ Caudate nucleus



Chorea is caused by damage to the basal ganglia, in particular the **Caudate nucleus**

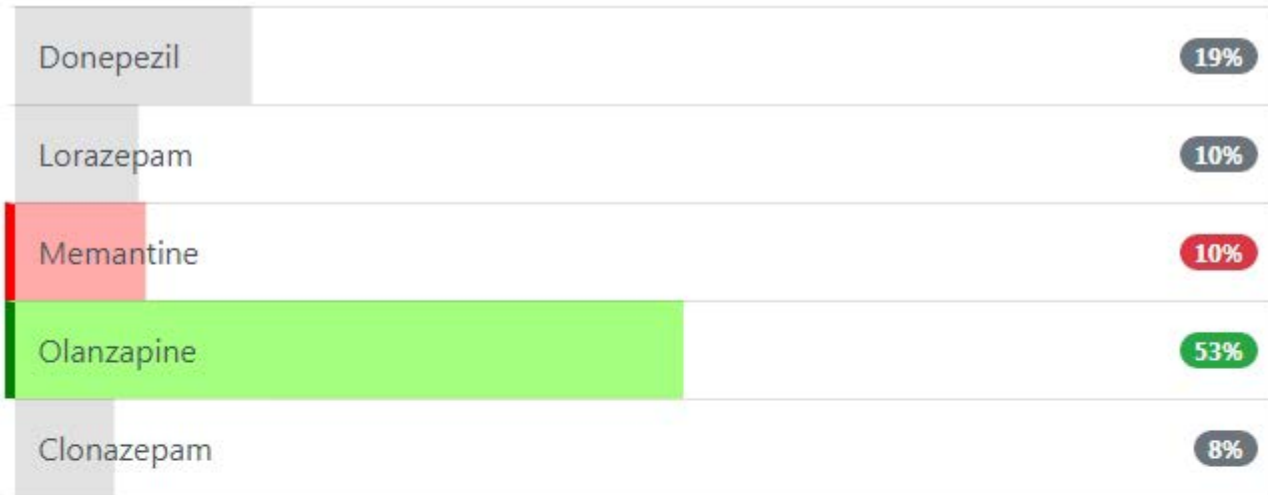
Important for me Less important

These symptoms are consistent with chorea, which may have a number of causes including SLE. Temporal lobe epilepsy would not cause continuous symptoms.

An 86-year-old man with Lewy body dementia is presents to memory clinic with his wife. His wife reports that his hallucinations have worsened, and he is becoming more confused. Despite the best efforts of his carers, he remains agitated. His wife feels threatened by him at times.

Which medication must be avoided?

- ☐ Donepezil
- ☐ Lorazepam
- ☐ Memantine
- ☐ Olanzapine
- ☐ Clonazepam



Antipsychotics are associated with a significant increase in mortality in dementia patients

Important for me Less important

In all dementia patients, antipsychotics should be avoided if possible due to the increase in mortality, particularly from cardiovascular causes. Lewy body dementia is a special case however: these patients are particularly sensitive to neuroleptic medication. In addition to the increase in mortality, neuroleptic medication will worsen motor symptoms, and put the patient at an especially high risk of neuroleptic malignant syndrome.

Acetylcholinesterase inhibitors such as donepezil are recommended by NICE in Lewy body dementia. Memantine is also recommended if acetylcholinesterase inhibitors are not tolerated. Benzodiazepines may be used with caution.

A 55-year-old male presented following a collapse. In his initial workup, he is found to have postural hypotension despite being on no anti-hypertensives. He was recently diagnosed with idiopathic Parkinson's disease and was started on Levodopa three months ago, but has noticed no substantial change from using it. He also confides that he has been having problems with impotence and has started using a catheter due to frequent episodes of urinary retention. What is the most likely diagnosis?

- ☐ Multi-system atrophy
- ☐ Normal progression of idiopathic Parkinson's disease
- ☐ Normal pressure hydrocephalus
- ☐ Progressive supranuclear palsy
- ☐ Corticobasal syndrome

Multi-system atrophy	51%
Normal progression of idiopathic Parkinson's disease	9%
Normal pressure hydrocephalus	20%
Progressive supranuclear palsy	13%
Corticobasal syndrome	6%

The correct answer is multi-system atrophy due to classical history of poor response to levodopa, impotence, urinary retention and age group.

The classical triad of idiopathic Parkinson's disease is rigidity, a resting tremor and bradykinesia (slowness of movement), collectively known as parkinsonism. Other features can include a shuffling gait, mask-like face, micrographia (small handwriting) and dementia.

Normal pressure hydrocephalus is characterised by progressive mental impairment and dementia, difficulty walking and impaired bladder control. The gait disturbance is often the most noticeable symptom, it can resemble a parkinsonian gait but unlike Parkinson's there is no rigidity or tremor.

Progressive supranuclear palsy starts with patients having impaired balance and therefore being prone to many falls. On examination, they have a vertical gaze palsy. It has a symmetrical onset and is poorly responsive to levodopa, unlike Parkinson's disease.

Corticobasal syndrome begins as a movement disorder, with a unilateral absence of movements and muscle rigidity with a tremor. It is a progressive neurological disorder that can also affect cognition.

Which one of the following features is most likely to be seen following facial nerve paralysis?

- ☐ Hyperacusis
- ☐ Hyperlacrimation
- ☐ Hyperesthesia
- ☐ Hyperalgesia
- ☐ Hypersalivation

Condition	Prevalence
Hyperacusis	63%
Hyperlacrimation	11%
Hyperesthesia	9%
Hyperalgesia	6%
Hypersalivation	11%

63%

Hyperlacrimation

11%

Hyperesthesia

9%

Hyperalgesia

6%

Hypersalivation

11%

Hyperacusis results from paralysis of the stapedius muscle. Overflow of tears may occur but hyperlacrimation does not.

A 35-year-old man with a history of migraines has been admitted to the medical take with a right-sided hemiparesis. On closer questioning, there is a family history of stroke and migraines. A CT brain reveals multiple hypodensities within the basal ganglia and temporal lobes, out of keeping for his age. A diagnosis of CADASIL is suspected. What is the pathophysiology of this condition?

- ☐ NOTCH3 mutation
- ☐ NOD2/CARD15 mutation
- ☐ FXN mutation
- ☐ GLA mutation
- ☐ SCN5a mutation

NOTCH3 mutation	44%
NOD2/CARD15 mutation	22%
FXN mutation	8%
GLA mutation	10%
SCN5a mutation	17%

CADASIL (also known as cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy) is the most common cause of hereditary cerebral small-vessel disease and vascular cognitive impairment in young adults. It is, as implied by the name, an autosomal dominant condition caused by a NOTCH3 mutation on chromosome 19. Characteristically, this presents with a migraine with aura, and a family history of such, which can ultimately lead to stroke-like features and is a recognised important cause of stroke in the young. Brain imaging will reveal multiple subcortical white matter lesions, particularly in the anterior temporal lobes and basal ganglia, out of keeping with the patient's age.

NOD2/CARD15 mutations are associated with Crohn's, FXN mutations are associated with Friedreich's ataxia and GLA mutations with Fabry disease. SCN5a mutations are associated with Brugada Syndrome.

A 25 year-old man presents with worsening bilateral sensorineural deafness. A trial of steroid therapy by his GP had been unsuccessful. He has an MRI scan which demonstrates bilateral lesions at the cerebellopontine angles. He recalls that his father had some form of brain tumours, but can't remember what. His father also has hearing impairment.

Which of the following chromosomes is likely to have a defect on genetic analysis?

☐ 3

☐ 16

☐ 17

☐ X

☐ 22



This man has neurofibromatosis type 2, indicated by the bilateral acoustic neuromas. This is autosomal dominant and is an inherited defect in chromosome 22.

Neurofibromatosis type 1 is due to a mutation in chromosome 17, von-Hippel Lindau is inherited via chromosome 3 and tuberous sclerosis is often associated with a mutation in chromosome 16 (as is polycystic kidney disease type 1).

Dr Assem

A 23-year-old man with difficult to control epilepsy is reviewed in clinic, four months after a change in his antiepileptic medication. He has remained seizure free but has gained 5 kg in weight since last reviewed. Which one of the following antiepileptic drugs is most associated with weight gain?

- ☐ Ethosuximide
- ☐ Sodium valproate
- ☐ Levetiracetam
- ☐ Carbamazepine
- ☐ Lamotrigine

Ethosuximide

5%

Sodium valproate

62%

Levetiracetam

8%

Carbamazepine

12%

Lamotrigine

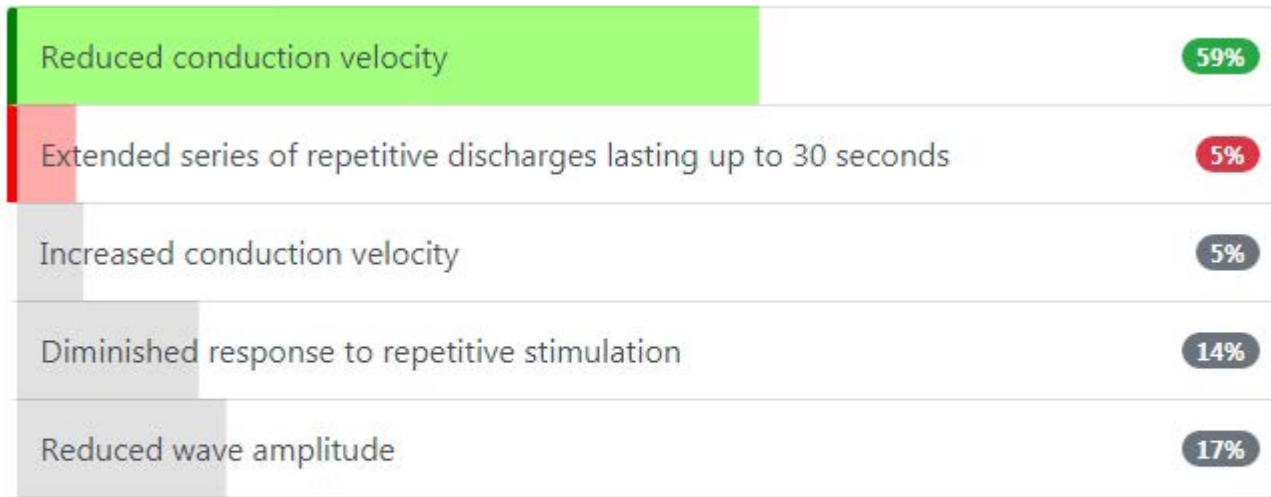
12%

Sodium valproate may cause weight gain

Important for me Less important

A 31-year-old female with progressive leg weakness has nerve conduction studies for suspected Guillain-Barre syndrome. Which one of the following findings would be most consistent with this diagnosis?

- ☐ Reduced conduction velocity
- ☐ Extended series of repetitive discharges lasting up to 30 seconds
- ☐ Increased conduction velocity
- ☐ Diminished response to repetitive stimulation
- ☐ Reduced wave amplitude



Slowing of the nerve conduction velocity usually indicates there is damage to the myelin sheath, as in Guillain-Barre syndrome

A 67-year-old woman comes for review with her husband. Her husband complains that she is constantly getting up from bed at night and pacing around the bedroom. She complains of 'antsy' legs and a 'horrible, creeping sensation'. Her symptoms generally come on in the evening and are only relieved by moving round. Given the likely diagnosis, what is the most appropriate treatment?

- ☐ Ropinirole
- ☐ Carbamazepine
- ☐ Amitriptyline
- ☐ Citalopram
- ☐ Quinine

Ropinirole

40%

Carbamazepine

11%

Amitriptyline

22%

Citalopram

10%

Quinine

17%

Restless leg syndrome - management includes dopamine agonists such as ropinirole

Important for me Less important

A 23-year-old man is admitted following the sudden onset of an occipital headache. On examination GCS is 15/15, neurological examination is unremarkable but neck stiffness is noted. A subarachnoid haemorrhage is suspected but the CT scan is normal. At what time should a lumbar puncture be done to exclude the diagnosis?

- ☐ Immediately
- ☐ 2 hours post-headache
- ☐ 4 hours post-headache
- ☐ 12 hours post-headache
- ☐ 24 hours post-headache



To detect a subarachnoid haemorrhage the LP should be done at least 12 hours after the start of the headache

Important for me Less important

A lumbar puncture should not be done until 12 hours after the onset of the headache to allow time for xanthochromia to develop.

SIGN guidelines state the following:

Subarachnoid blood degrades rapidly. Performing CT brain imaging as soon as possible maximises the chance of accurate diagnosis. Even timely CT brain imaging may not pick up subarachnoid blood, so lumbar puncture is also required. Lumbar puncture should be delayed till 12 hours after headache onset.

If the patient was acutely unwell or had an altered GCS then discussion with neurosurgery may be appropriate rather than waiting 12 hours.

--	--	--	--

A 5-year-old boy is referred by his GP to the neurology clinic with abnormal movements. His mother noticed that for the last year, the boy is starting to fall over more and more frequently. He has also been having increasingly slurred speech. These have been getting progressively worse. He has had recurrent chest infections in his childhood.

What is the most likely diagnosis?

- ☐ Friedreich's ataxia
- ☐ Infantile-onset spinocerebellar ataxia
- ☐ Di-George syndrome
- ☐ Cerebral palsy
- ☐ Ataxic telangiectasia

Friedreich's ataxia	29%
Infantile-onset spinocerebellar ataxia	11%
Di-George syndrome	17%
Cerebral palsy	6%
Ataxic telangiectasia	37%

Ataxic telangiectasia is characterised by cerebellar ataxia and telangiectasia, onset is in childhood

Important for me Less important

Ataxic telangiectasia is characterised by cerebellar ataxia and telangiectasia, onset is in childhood. Immune deficiency is also a feature, manifesting in frequent childhood infections.

Friedreich's ataxia and Infantile-onset spinocerebellar ataxia do not present with immunodeficiency.

Cerebral palsy does not present with ataxia.

Di-George syndrome is a cause of immune deficiency but does not usually cause ataxia.

A 47-year-old man presents to the Emergency Department with a three day history of severe headache associated with vomiting. There is no past medical history of note. On examination blood pressure is 98/62 mmHg, pulse is 108 bpm and temperature is 37.0°C. There is mild neck stiffness and a partial third nerve palsy of the left eye. Blood tests reveal:

Hb	14.8 g/dl
Plt	373 * 10 ⁹ /l
WBC	13.6 * 10 ⁹ /l
Na ⁺	132 mmol/l
K ⁺	5.2 mmol/l
Urea	4.2 mmol/l
Creatinine	99 µmol/l
Free T4	9 pmol/l (range 10-22)

What is the most likely diagnosis?

- ☐ Subarachnoid haemorrhage
- ☐ Cavernous sinus thrombosis
- ☐ Meningitis
- ☐ Pituitary apoplexy
- ☐ Lateral sinus thrombosis

Subarachnoid haemorrhage

18%

Cavernous sinus thrombosis

22%

Meningitis

11%

Pituitary apoplexy

40%

Lateral sinus thrombosis

9%

The hypotension, electrolytes and low free T4 point towards hypopituitarism. Clinically, pituitary apoplexy can mimic a subarachnoid haemorrhage

Which of the following drugs is least likely to cause peripheral neuropathy?

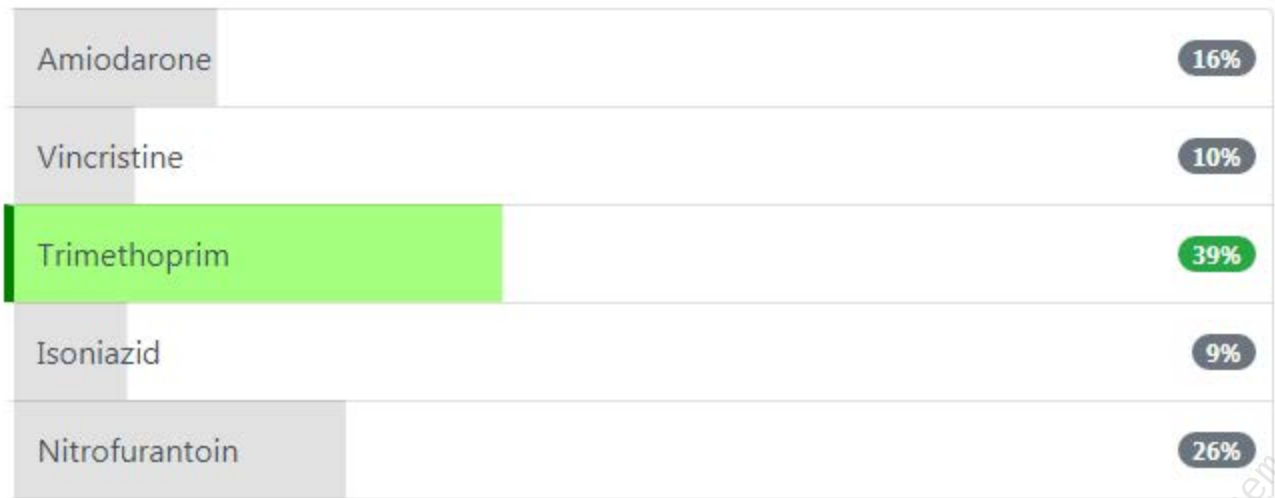
☐ Amiodarone

☐ Vincristine

☐ Trimethoprim

☐ Isoniazid

☐ Nitrofurantoin



Trimethoprim is not listed in the BNF as causing peripheral neuropathy

In patients with Guillain-Barre syndrome, respiratory function should be monitored with:

- ☐ Oxygen saturations
- ☐ PEFR
- ☐ Flow volume loop
- ☐ Arterial blood gases
- ☐ Forced vital capacity

Oxygen saturations

4%

PEFR

19%

Flow volume loop

11%

Arterial blood gases

4%

Forced vital capacity

62%

FVC is used to monitor respiratory function in Guillain-Barre syndrome

Important for me

Less important

A 35-year-old woman is seen in the emergency department with right-sided facial weakness. She first noticed the weakness yesterday morning but did not think it was anything serious and so did not seek medical attention. She has been brought in today by her friend who is concerned that the weakness has become worse overnight. Her observations are unremarkable. Cranial nerve exam reveals unilateral weakness of the facial muscles in the distribution of the VII nerve affecting the entire right side of the face. She has no other focal neurology in the face, arms or legs and the skin is intact with no lesions. Bloods done on arrival are normal.

Given the underlying diagnosis what is the most appropriate management of this patient?

☐ CT head

☐ Aspirin

☐ Prednisolone

☐ Aciclovir

☐ Prednisolone + Aciclovir

CT head	8%
Aspirin	5%
Prednisolone	72%
Aciclovir	4%
Prednisolone + Aciclovir	11%

Treatment of Bell's Palsy is with prednisolone because it increases the likelihood of complete recovery

Important for me Less important

This patient has Bell's Palsy. This is a clinical diagnosis of exclusion and in the absence of symptoms/signs that are atypical for Bell's Palsy, neuroimaging is not indicated.

Obviously, upper motor neuron (UMN) facial nerve weakness (with forehead sparing) raises concern about the possibility of a stroke and would demand neuroimaging to exclude this. However, in the context of an isolated lower motor neurone facial nerve weakness, with typical features of Bell's Palsy this is not necessary at this stage.

The treatment of choice for Bell's Palsy is prednisolone (1mg/kg) for 10 days and this should be started within 72 hours of symptom onset. Prednisolone has been shown to increase the likelihood of complete recovery.

A 24-year-old man is seen in the 'First Seizure' clinic. He has been referred by the local the Emergency Department following a single episode of a witnessed seizure. Which one of the following factors would be least relevant when deciding whether to start anti-epileptic drugs after a single seizure?

- ☐ Brain imaging shows a structural abnormality
- ☐ The patient has a neurological deficit
- ☐ The EEG shows unequivocal epileptic activity
- ☐ The patient is less than 45 years old
- ☐ The patient considers the risk of having a further seizure unacceptable

Brain imaging shows a structural abnormality

7%

The patient has a neurological deficit

5%

The EEG shows unequivocal epileptic activity

9%

The patient is less than 45 years old

64%

The patient considers the risk of having a further seizure unacceptable

16%

A 72-year-old man presents to the Emergency Department. Whilst walking back from a friend's house he slipped on some ice and fell backwards, landing on his right arm and banging his head on the kerb in the process. His past medical history includes atrial fibrillation for which he takes bisoprolol and warfarin. A routine INR taken four days ago was 2.2. There are no signs of any external injury to his right arm or scalp. What is the most appropriate course of action with relation to his head injury?

- ☐ Arrange a CT head scan to be performed within 8 hours
- ☐ Discharge with standard head injury advice
- ☐ Admit for 24 hours of observation
- ☐ Admit for 8 hours of observation
- ☐ Discharge with standard head injury advice + advise he stops warfarin for 5 days



Patients who've had a head injury and are on warfarin need to have a CT scan, regardless of whether they have risk factors for an intracranial injury.

An 18-year-old girl with a known Chiari 1 malformation presents to her General Practitioner with loss of sensation in both of her arms and forearms, and on the back of her neck. On testing, she specifically can't feel pain and temperature but can detect fine touch, proprioception and vibration.

Which of the following abnormalities has this patient most likely have?

- ☐ Syringomyelia
- ☐ Hydrocephalus
- ☐ Brain stem compression
- ☐ Cerebellar compression
- ☐ Peripheral neuropathy

Syringomyelia	72%
Hydrocephalus	6%
Brain stem compression	8%
Cerebellar compression	7%
Peripheral neuropathy	7%

Chiari malformations are often associated with syringomyelia due to disturbed cerebrospinal fluid flow at the foramen magnum

Important for me Less important

Chiari 1 malformation is a condition characterised by herniation of the cerebellar tonsils through the foramen magnum. It causes symptoms by compressing the brainstem, cerebellum and by disturbing the flow of cerebrospinal fluid (CSF). Disturbed CSF flow either causes hydrocephalus (uncommon) or syringomyelia (common; ~50%).

Syringomyelia is a dilatation of a CSF space within the spinal cord. It occurs within the cervical and thoracic segments and causes compression of the spinothalamic tracts decussating in the anterior white commissure. This results in dissociative loss of sensation of pain, temperature and non-discriminative touch. There is classically a 'cape-like' distribution of this sensory loss.

A 27-year-old man presents to the Emergency Department with 2 day history of severe headache and pyrexia (38.2°C). A CT scan is reported as follows:

CT: Brain

Petechial haemorrhages in the temporal and inferior frontal lobes. No mass effect. Brain parenchyma otherwise normal

What is the most likely diagnosis?

- ☐ Brain abscess
- ☐ Meningococcal meningitis
- ☐ Cerebral malaria
- ☐ Herpes simplex encephalitis
- ☐ New variant CJD

Brain abscess

11%

Meningococcal meningitis

18%

Cerebral malaria

14%

Herpes simplex encephalitis

43%

New variant CJD

14%

CT head showing temporal lobe changes - think herpes simplex encephalitis

Important for me Less important

Which one of the following infections is most strongly associated with the development of Guillain-Barre syndrome

☐ *Shigella*

☐ *Salmonella*

☐ *E. coli* H7:0157

☐ Herpes simplex

☐ *Campylobacter jejuni*

<i>Shigella</i>		4%
<i>Salmonella</i>		4%
<i>E. coli</i>	H7:0157	8%
Herpes simplex		5%
<i>Campylobacter jejuni</i>		79%

Campylobacter jejuni is strongly associated with the development of Guillain-Barre syndrome

You review a 62-year-old man three days after he had been admitted with an acute coronary syndrome. His past medical history includes myasthenia gravis for which he takes long-term prednisolone. Since admission his symptoms of myasthenia have become markedly worse. In particular you notice bilateral ptosis and slurring of speech. Which of the following recently started medications is most likely to be responsible?

☐ Clopidogrel

☐ Atorvastatin

☐ Ramipril

☐ Aspirin

☐ Bisoprolol

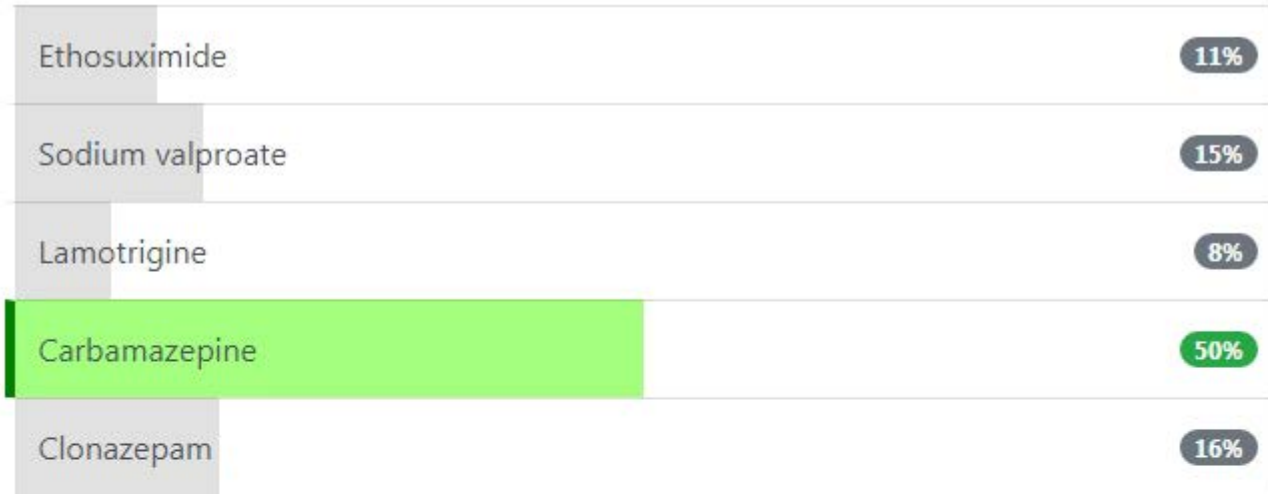


Beta-blockers such as bisoprolol are common precipitants of myasthenic crises.

A 10-year-old is referred to neurology due to episodes her GP feels are epileptiform. Her mother reports that she appears to just 'stop', sometimes even in mid conversation, for several seconds at random times during the day. During these episodes she can be unresponsive to questioning and has no recollection of them.

Which of these drugs is contraindicated in this condition?

- ☐ Ethosuximide
- ☐ Sodium valproate
- ☐ Lamotrigine
- ☐ Carbamazepine
- ☐ Clonazepam



Carbamazepine is contraindicated in absence seizures

Important for me **Less important**

These are absence seizures. Ethosuximide is the gold standard treatment and valproate, lamotrigine and clonazepam can all be useful.

Carbamazepine is contraindicated and can worsen absence seizures (along with phenytoin, vigabatrin and gabapentin).

Dr Assem

A 59-year-old man with no significant past medical history is admitted to hospital following an ischaemic stroke. He presented outside of the thrombolysis window and is treated with aspirin for the first few days. His blood pressure is 130/80 mmHg, fasting glucose is 5.6 mmol/l and fasting cholesterol is 3.9 mmol/l. He makes a good recovery and has regained nearly all of his previous functions upon discharge. Following recent NICE guidelines, which of the following medications should he be taking upon discharge (i.e. after 14 days)?

- ☐ Aspirin + statin
- ☐ Aspirin + dipyridamole + statin + ramipril
- ☐ Clopidogrel + statin
- ☐ Aspirin + dipyridamole
- ☐ Aspirin + dipyridamole + statin

Aspirin + statin

13%

Aspirin + dipyridamole + statin + ramipril

8%

Clopidogrel + statin

59%

Aspirin + dipyridamole

6%

Aspirin + dipyridamole + statin

14%

A 73-year-old male presents with progressively worsening gait and urinary urgency. He is diagnosed with degenerative cervical myelopathy. Which ONE of the following is true regarding this condition?

- ☐ Smoking is not a risk factor in isolation
- ☐ Asians can have a different underlying aetiology than caucasians
- ☐ Bowel and bladders symptoms are rare and should prompt consideration of cauda equina syndrome
- ☐ Most patients present with a classic triad of neck pain, finger paraesthesias and weak legs
- ☐ Family history is of limited value

Smoking is not a risk factor in isolation	7%
Asians can have a different underlying aetiology than caucasians	25%
Bowel and bladders symptoms are rare and should prompt consideration of cauda equina syndrome	22%
Most patients present with a classic triad of neck pain, finger paraesthesias and weak legs	32%
Family history is of limited value	14%

Asian populations have a higher rate of ossification of the posterior longitudinal ligament (OPLL), which can result in myelopathy.

Degenerative cervical myelopathy (DCM) has a number of risk factors, which include smoking due to its effects on the intervertebral discs (A, false), genetics (option E, false) and occupation - those exposing patients to high axial loading [1].

The presentation of DCM is very variable (option D, false). Early symptoms are often subtle and can vary in severity day to day, making the disease difficult to detect initially. However as a progressive condition, worsening, deteriorating or new symptoms should be a warning sign.

DCM symptoms can include any combination of [1]:

Pain (affecting the neck, upper or lower limbs)

Loss of motor function (loss of digital dexterity, preventing simple tasks such as holding a fork or doing up their shirt buttons, arm or leg weakness/stiffness leading to impaired gait and imbalance)

Loss of sensory function causing numbness

Loss of autonomic function (urinary or faecal incontinence and/or impotence) - these can occur and do not necessarily suggest cauda equina syndrome in the absence of other hallmarks of that condition

The most common symptoms at presentation of DCM are unknown, but in one series 50% of patients were initially incorrectly diagnosed and sometimes treated for carpal tunnel syndrome [2].

References

1. Baron EM, Young WF. Cervical spondylotic myelopathy: a brief review of its pathophysiology, clinical course, and diagnosis. *Neurosurgery*. 2007 Jan;60(1 Suppl 1):S35-41.

2. Behrbalk E, Salame K, Regev GJ, Keynan O, Boszczyk B, Lidar Z. Delayed diagnosis of cervical spondylotic myelopathy by primary care physicians. *Neurosurg Focus*. 2013 Jul;35(1):E1.

A 50-year-old man develops chronic, severe pain after sustaining a brachial plexus injury as a result of motorbike accident. He has had no benefit from paracetamol or ibuprofen. He has had a trial of amitriptyline which was not successful. Following recent NICE guidelines, what is the most appropriate medication to consider?

- ☐ Sertraline
- ☐ Topical lidocaine
- ☐ Carbamazepine
- ☐ Pregabalin
- ☐ Buprenorphine

Sertraline

6%

Topical lidocaine

6%

Carbamazepine

11%

Pregabalin

72%

Buprenorphine

6%

A 73-year-old woman presents with episodic confusion and headaches for the past week. She has a history of alcohol excess and a background of atrial fibrillation and type 2 diabetes mellitus. Her daughter reports that she has been having frequent spells of confusion over the past few days. Last year she was assessed for frequent falls. Her current medications include bisoprolol, metformin and warfarin. Neurological examination is unremarkable and her blood sugar is 6.7 mmol/l. What is the most likely diagnosis?

- ☐ Korsakoff's syndrome
- ☐ Wernicke's encephalopathy
- ☐ Extradural haematoma
- ☐ Subarachnoid haemorrhage
- ☐ Subdural haematoma

Korsakoff's syndrome

11%

Wernicke's encephalopathy

20%

Extradural haematoma

8%

Subarachnoid haemorrhage

5%

Subdural haematoma

55%

Fluctuating confusion/consciousness? - subdural haematoma

Important for me Less important

This patient has a number of risk factors for a subdural haematoma including old age, alcoholism and anticoagulation. Korsakoff's syndrome and Wernicke's encephalopathy do not usually cause headaches.

A 67-year-old man is reviewed in the neurology clinic due to concerns about increasing clumsiness. Examination reveals an ataxic gait and increased upper limb tone with cog-wheel rigidity. Blood pressure is 135/80 lying and 95/70 standing. What is the most likely diagnosis?

- ☐ Motor neuron disease
- ☐ Progressive supranuclear palsy
- ☐ Parkinson's disease
- ☐ Multiple sclerosis
- ☐ Multiple system atrophy

Motor neuron disease

5%

Progressive supranuclear palsy

13%

Parkinson's disease

34%

Multiple sclerosis

4%

Multiple system atrophy

44%

Whilst postural hypotension may be seen in Parkinson's disease the ataxic gait points towards a diagnosis of multiple system atrophy.

The following drugs commonly exacerbate myasthenia gravis, except:

☐ Methotrexate

☐ Gentamicin

☐ Beta-blockers

☐ Quinidine

☐ Penicillamine

Methotrexate

45%

Gentamicin

13%

Beta-blockers

18%

Quinidine

10%

Penicillamine

13%

A 24-year-old woman with Charcot-Marie-Tooth disease (type 1) asks how likely it is that any future children will have the disease. What is the most accurate answer?

☐ Three times as likely as background population

☐ 25%

☐ Between 5 - 10%

☐ Same as background population

☐ 50%



Charcot-Marie-Tooth disease (hereditary sensorimotor neuropathy type I) is an autosomal dominant condition and therefore 50% of children will be affected

A 50-year-old man presents to the emergency department with a one-hour history of right-sided weakness and facial droop, which has now entirely resolved. He has a past medical history of migraines with aura, which started around 8 years ago, and low mood. He had a similarly brief episode of sudden dizziness and slurred speech six months ago but did not seek medical attention. His father had similar experiences in his 50s but died in a road traffic accident aged 60.

The patient's CT head is normal. He has an MRI head which shows a number of hyperintense lesions. What is the most likely cause for his symptoms?

- ☐ Early onset Alzheimer's disease
- ☐ CADASIL
- ☐ Huntington's disease
- ☐ Variant Creutzfeldt-Jacob disease
- ☐ Atypical migraine

Early onset Alzheimer's disease	5%
CADASIL	56%
Huntington's disease	10%
Variant Creutzfeldt-Jacob disease	16%
Atypical migraine	13%

CADASIL is a rare cause of multiple cerebral infarctions

Important for me Less important

The correct answer is CADASIL - cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy. This is a genetic condition due to a mutation in the NOTCH3 gene. It usually presents with the onset of migraines in middle age, followed by recurrent TIAs and strokes, and resulting in neuro-cognitive decline, psychiatric problems and dementia. MRI often shows multiple widespread hyper-intense lesions in the white matter, basal ganglia, thalamus and pons.

CADASIL foundation:

<https://www.cadasilfoundation.org/what.html>

You review a 25-year-old man who is complaining of leg weakness. Other than a bout of diarrhoea three weeks ago he has been feeling fit and well and has no significant medical history. On examination you note reduced power in his legs, normal sensation and reduced knee and ankle reflexes. His pulse is 78/min and blood pressure is 122/84 mmHg (standing), 100/64 mmHg (sitting). What is the most likely diagnosis?

- ☐ Botulism food poisoning
- ☐ Guillain-Barre syndrome
- ☐ Cauda equina syndrome
- ☐ Myasthenia gravis
- ☐ Transverse myelitis

Botulism food poisoning

6%

Guillain-Barre syndrome

81%

Cauda equina syndrome

4%

Myasthenia gravis

4%

Transverse myelitis

5%

A 64-year-old female with a history of rheumatoid arthritis presents with increased difficulty in walking. On examination there is weakness of ankle dorsiflexion and of the extensor hallucis longus associated with loss of sensation on the lateral aspect of the lower leg. What is the most likely diagnosis?

- ☐ Tibial nerve palsy
- ☐ Obturator nerve palsy
- ☐ Common peroneal nerve palsy
- ☐ Lateral cutaneous nerve palsy
- ☐ Pudendal nerve palsy

Tibial nerve palsy

11%

Obturator nerve palsy

4%

Common peroneal nerve palsy

69%

Lateral cutaneous nerve palsy

12%

Pudendal nerve palsy

5%

A 34-year-old woman who presents with confusion, headache and fever is admitted to the Emergency Department. Shortly after admission she has a seizure. A MRI scan is performed which shows patchy haemorrhagic changes in the temporal lobe. Given the likely diagnosis, what is the treatment of choice?

- ☐ Supportive treatment + intravenous cefotaxime
- ☐ Supportive treatment + intravenous aciclovir
- ☐ Supportive treatment + intravenous amphotericin B
- ☐ Supportive treatment alone
- ☐ Supportive treatment + intravenous immunoglobulin

Supportive treatment + intravenous cefotaxime

9%

Supportive treatment + intravenous aciclovir

71%

Supportive treatment + intravenous amphotericin B

6%

Supportive treatment alone

7%

Supportive treatment + intravenous immunoglobulin

8%

A 45-year-old man presents with dizziness and right-sided hearing loss. Which one of the following tests would most likely indicate an acoustic neuroma?

- ☐ Jerky nystagmus
- ☐ Left homonymous hemianopia
- ☐ Tongue deviated to the left
- ☐ Fasciculation of the tongue
- ☐ Absent corneal reflex



Loss of corneal reflex - think acoustic neuroma

Important for me Less important

A 45-year-old woman who works in a children's nursery presents due to 'weakness' in her right foot. This has developed over the past couple of days. She is otherwise well and reports no other symptoms.

On examination, you note a high-stepping gait on the right side. Weakness of the right foot dorsiflexors is noted. All reflexes in the lower limb are normal and no fasciculations are noted. Hip abduction strength is normal.

What is the most appropriate management?

- ☐ Admit for CT head and lumbar puncture
- ☐ Urgent referral to neurology
- ☐ Advice to avoid leg crossing, squatting or kneeling and review in 4 weeks
- ☐ Advise the patient to increase their vitamin D consumption
- ☐ Arrange nerve conduction studies

Admit for CT head and lumbar puncture

8%

Urgent referral to neurology

15%

Advice to avoid leg crossing, squatting or kneeling and review in 4 weeks

48%

Advise the patient to increase their vitamin D consumption

4%

Arrange nerve conduction studies

24%

Leg crossing, squatting or kneeling may cause a foot drop secondary to a common peroneal neuropathy

Important for me Less important

This patient has foot drop secondary to a common peroneal nerve lesion. This may have been precipitated by kneeling and squatting in her job at the nursery.

In the absence of other findings, conservative management with advice is appropriate initially.

Dr Assem

A 71-year-old woman is prescribed ondansetron to help treat nausea which has not responded to either metoclopramide or cyclizine. What is the mechanism of action of ondansetron?

- ☐ 5-HT3 antagonist
- ☐ 5-HT2 antagonist
- ☐ Dopamine antagonist
- ☐ NK1 receptor antagonist
- ☐ Antihistamine

5-HT3 antagonist

74%

5-HT2 antagonist

14%

Dopamine antagonist

6%

NK1 receptor antagonist

3%

Antihistamine

3%

Examples of dopamine antagonists include metoclopramide and domperidone.

A 32-year-old woman visited her GP two weeks ago complaining of thick green nasal secretions, a fever and facial pain. There is tenderness on palpation of the maxillary and frontal sinuses. The patient was reassured that she as suffering from acute sinusitis which should resolve itself in 2-3 weeks without antibiotic therapy.

She now has a frontal headache with nausea. She is also having increasing difficulty lifting her right arm and leg. She presents herself to the emergency department with these new symptoms, whilst in the department, she has a seizure.

Which complication of acute sinusitis has she developed?

☐ Cerebral stroke
☐ Meningitis
☐ Cerebral abscess
☐ Cavernous sinus thrombosis
☐ Intracranial bleed

Dr Assem

Cerebral stroke

4%

Meningitis

9%

Cerebral abscess

49%

Cavernous sinus thrombosis

35%

Intracranial bleed

3%

Sinusitis + focal neurology and fever → ?brain abscess

Important for me Less important

A common cause of a brain abscess is ascending infection from middle ear or from facial sinuses. Appropriate safety netting is necessary in primary care to ensure prompt treatment of complications in sinusitis. Cavernous sinus thrombosis is another important complication in sinusitis but usually presents with unilateral facial oedema, photophobia, proptosis and palsies of the cranial nerves which pass through it (III, IV, V, VI).

A 30-year-old lady with no past medical history presents to the emergency department with a 2-day history of pins and needles in the lower limbs and progressive walking difficulties. She offers a history of a diarrhoeal illness 1 week ago. On examination, there is a loss of pinprick sensation in the lower limbs from mid-thigh distally and in the upper limbs from MCP joints distally. There is a bilateral weakness of ankle dorsiflexion to 3/5 and knee flexion and extension is weak to 4/5 bilaterally. Power in upper and lower limbs is otherwise normal. Knee and ankle deep tendon reflexes are absent. What is the most likely diagnosis?

- ☐ Multiple sclerosis
- ☐ Guillain-Barre syndrome
- ☐ Functional neurological syndrome
- ☐ Chronic inflammatory demyelinating polyneuropathy
- ☐ Botulism

Multiple sclerosis	4%
Guillain-Barre syndrome	78%
Functional neurological syndrome	3%
Chronic inflammatory demyelinating polyneuropathy	7%
Botulism	7%

The correct answer is Guillain-Barre syndrome

Functional neurological syndrome can be discounted due to the presence of hard neurological signs

MS can be excluded due to the presence of lower motor neuron signs (i.e. areflexia) and absence of upper motor neuron signs

Chronic inflammatory demyelinating polyneuropathy (CIDP) is the chronic form of Guillain-barre syndrome (also known as acute inflammatory demyelinating polyneuropathy). Guillain-barre syndrome reaches its nadir within three to four weeks, whereas CIDP is defined by progression for longer than 8 weeks.

The diarrhoeal illness may be relevant. Prior *Campylobacter* infection confers a poorer prognosis

Which one of the following is least associated with the development of chorea?

- ☐ Ataxic telangiectasia
- ☐ SLE
- ☐ Wilson's disease
- ☐ Pregnancy
- ☐ Infective endocarditis



Chorea can be a very rare manifestation of infective endocarditis, following embolisation to the basal ganglia. It is however the least likely of the above five options

Which one of the following haematological disorders is most associated with gingival hyperplasia?

☐ Chronic lymphocytic leukaemia

☐ Myelofibrosis

☐ Polycythaemia rubra vera

☐ Haemophilia A

☐ Acute myeloid leukaemia

Chronic lymphocytic leukaemia

15%

Myelofibrosis

13%

Polycythaemia rubra vera

13%

Haemophilia A

6%

Acute myeloid leukaemia

53%

Gingival hyperplasia: phenytoin, ciclosporin, calcium channel blockers and AML

Important for me Less important

An 80-year-old man is investigated for progressive cognitive impairment. Which one of the following features is most suggestive of Lewy body dementia?

- ☐ Disinhibition
- ☐ Emotional lability
- ☐ Symptoms worsen with neuroleptics
- ☐ Urinary incontinence
- ☐ Paucity of extrapyramidal signs

Disinhibition

8%

Emotional lability

10%

Symptoms worsen with neuroleptics

67%

Urinary incontinence

7%

Paucity of extrapyramidal signs

9%

A 58-year-old female presents to general practice complaining of weakness in her legs. She reports increasing difficulty climbing stairs and getting up from sitting positions.

On taking a history, you note she has no significant past medical history but has smoked for most of her adult life.

On examination, you note a waddling gait, reduced strength in proximal muscles of all limbs and reduced tendon reflexes. there is no wasting, fasciculations, sensory abnormalities or ocular symptoms. On repetitive movements, her weakness appears to initially improve.

Given the likely diagnosis, the presence of which of the following antibodies in the blood would be diagnostic?

- ☐ ACh receptor antibodies
- ☐ Anti-Mi-2 antibodies
- ☐ Antinuclear antibody
- ☐ Rheumatoid factor
- ☐ Voltage-gated calcium-channel antibodies

ACh receptor antibodies	12%
Anti-Mi-2 antibodies	8%
Antinuclear antibody	4%
Rheumatoid factor	3%
Voltage-gated calcium-channel antibodies	74%

Lambert-Eaton Syndrome or Myasthenia Gravis? Weakness in Lambert Eaton improves after exercise, unlike Myasthenia Gravis; which worsens after exercise

Important for me Less important

ACh receptor antibodies are associated with Myasthenia Gravis (MG). MG can present with isolated proximal muscle weakness, however, more commonly presents with ocular symptoms i.e. ptosis. MG is characterized by increased fatigability with exercise, unlike this patient whose weakness initially improves with exercise.

Anti-Mi-2 antibodies are associated with dermatomyositis. Another differential for proximal muscle weakness, but usually also presents with systemic upset and rash.

Antinuclear antibody is used in the diagnosis of various autoimmune conditions, in particular, systemic lupus erythema which would present differently.

Rheumatoid factor (RF) is used as a marker of inflammatory and autoimmune activity. RF is commonly used alongside other tests to aid the diagnosis of rheumatoid arthritis. Rheumatoid factor has no role in the diagnosis of Lambert-Eaton Myasthenic Syndrome (LEMS). This patient has no joint symptoms, which makes the diagnosis of rheumatoid disease less likely.

Voltage-gated calcium-channel antibodies are suggestive of Lambert-Eaton Myasthenic Syndrome (LEMS). LEMS is characterized by weakness, particularly of the proximal muscles, which improves (initially) with exercise. This condition generally presents in later life, unlike MG which has peaks in the 3rd and 6th decades. LEMS is often associated with an underlying malignancy, most commonly small cell lung cancer. This patient's smoking history gives another clue in favour of this diagnosis.

A 41-year-old female presents with double vision and difficult walking for the last 1 week. She says she has been falling a lot the past week and has double visions when looking left or right. She had a cold 4 weeks ago. On examination, one notes a wide based gait (ataxia), areflexia in the lower limbs and ophthalmoplegia in all directions. There were no other neurological deficits or systemic symptoms such as weight loss noted. Blood tests which included an autoimmune screen were positive for Anti-GQ1b antibodies. What is the most likely diagnosis?

- ☐ Meningoencephalitis
- ☐ Cerebral venous sinus thrombosis
- ☐ Miller Fisher syndrome
- ☐ Vasculitis
- ☐ Paraneoplastic syndrome

Meningoencephalitis	5%
Cerebral venous sinus thrombosis	6%
Miller Fisher syndrome	78%
Vasculitis	5%
Paraneoplastic syndrome	6%

Miller-Fisher syndrome is a variant of Guillain-Barre syndrome. Anti-GQ1b antibodies are present in 90% of patients with Miller-Fischer syndrome. Ataxia, areflexia and ophthalmoplegia are characteristic of Miller-Fisher syndrome. Anti-GQ1b antibodies are not present in the other four options. Miller-Fisher syndrome normal presents as descending paralysis as opposed to ascending paralysis.

Meningoencephalitis normally presents with more systemic symptoms such as headache, fever, photophobia, seizures and reduced consciousness in severe cases. It doesn't present with areflexia or ataxia normally.

In paraneoplastic syndrome you would expect symptoms of malignancy such as weight loss or any ongoing systemic symptoms which the patient doesn't have.

In vasculitis, you would expect the patient to have a vasculitic rash which is not noted in this case.

A 14-year-old male is noted to have optic atrophy on fundoscopy. Neurological exam reveals dysarthric speech and nystagmus. Knee and ankle jerks are absent but there is an extensor plantar response. What is the likely diagnosis?

- ☐ Leber's optic atrophy
- ☐ Ataxic telangiectasia
- ☐ Friedreich's ataxia
- ☐ Subacute combined degeneration of the cord
- ☐ Multiple sclerosis

Leber's optic atrophy

18%

Ataxic telangiectasia

11%

Friedreich's ataxia

54%

Subacute combined degeneration of the cord

7%

Multiple sclerosis

10%

Multiple sclerosis would be unlikely at this age

A 44-year-old man presents to his GP complaining of weakness in his hands and legs and numbness in his feet. He first noticed some problems with walking in his late teens and reports that he's always been "clumsy" and will often trip over. He is otherwise well and takes no regular medications. On examination, he has a high-stepping gait with wasting of the lower legs and high arches. Power is reduced in all limbs and reflexes are difficult to elicit. There is a reduction in sensation which is more pronounced distally. Coordination is intact.

What is the most likely diagnosis?

- ☐ Duchenne muscular dystrophy
- ☐ Cervical spondylotic myelopathy
- ☐ Guillain-Barre syndrome
- ☐ Subacute combined degeneration of the cord
- ☐ Charcot-Marie-Tooth disease

Duchenne muscular dystrophy	17%
Cervical spondylotic myelopathy	7%
Guillain-Barre syndrome	7%
Subacute combined degeneration of the cord	12%
Charcot-Marie-Tooth disease	57%

Charcot-Marie-Tooth disease can affect both motor and sensory peripheral nerves

Important for me Less important

Charcot-Marie-Tooth disease is a hereditary sensory and motor peripheral neuropathy. UMN signs are not present in these patients. Patients can present with lower motor neurone signs in all limbs and reduced sensation (more pronounced distally).

Duchenne muscular dystrophy is an inherited myopathy. It is caused by progressive degeneration and weakness of specific muscle groups. Most patients lose the ability to walk by 12 years of age and require ventilatory support by the age of 25. Sensation is intact in these patients.

Cervical spondylosis is the term used for osteoarthritis of the spine and can result in compression of the spinal cord. This is more likely to result in LMN signs at the level of the compression (ie. upper limb if the lesion is below C5) with UMN signs below (in the lower limb). Patients usually complain of neck pain and stiffness.

Guillain-Barre syndrome (GBS) is an inflammatory peripheral sensory and motor neuropathy. It typically presents over the course of days to weeks, not years. There is often a recent bacterial or viral infection in the history.

Patients with subacute combined degeneration of the cord (SCDC) classically have an ataxic gait (due to degeneration of the dorsal columns) and mixed UMN and LMN signs (due to degeneration of lateral motor tracts and peripheral nerves). The history will typically be subacute, occurring over months rather than decades. Patients with SCDC often notice sensory symptoms before weakness.

A 65-year-old male is admitted with a left sided facial droop. He states that her noticed it when he woke up this morning. He has no past medical history and takes no regular medicines. On examination he has a left sided facial droop which spares the forehead muscles.

Blood tests are as follows:

Hb	145 g/l	Na ⁺	136 mmol/l
Platelets	489 * 10 ⁹ /l	K ⁺	3.9 mmol/l
WBC	9.2 * 10 ⁹ /l	Urea	6.2 mmol/l
Neuts	6.4 * 10 ⁹ /l	Creatinine	42 µmol/l
Lymphs	2.2 * 10 ⁹ /l	CRP	10 mg/l
Glucose	11.5 mmol/l		

What is the most likely cause?

- ☐ Bell's palsy
- ☐ Acoustic neuroma
- ☐ Stroke
- ☐ Sarcoidosis
- ☐ Diabetes mellitus

Dr Assem

Bell's palsy	27%
Acoustic neuroma	5%
Stroke	57%
Sarcoidosis	3%
Diabetes mellitus	8%

In facial nerve palsy, upper motor neuron lesions spare the upper face (i.e. forehead)

Important for me Less important

When assessing facial nerve palsy, it is extremely important to establish if it is an upper motor neurone weakness or lower motor neurone weakness. The region of the facial nerve nuclei responsible for forehead muscles is innervated bilaterally from the upper motor neurones of the corticobulbar tracts. Therefore lesions of the upper motor neurones will spare the forehead (as the facial nerve nuclei will still receive input from the contralateral tracts). In contrast, lesions of the lower motor neurones will affect all the facial nerve muscles.

This patient has sparing of the forehead muscles making stroke the only plausible explanation. All the other options cause a lower motor neurone pattern of weakness.

The blood results suggest a diagnosis of diabetes. Indeed, diabetes can cause mononeuritis multiplex, however this would be expected to cause a lower motor neurone facial nerve weakness. Diabetes mellitus itself is a strong risk factor for stroke.

A 72-year-old gentleman with a history of hypertension and stroke presents to the emergency department accompanied by his wife. His wife reported him waking at 7am confused. Repetitive questioning was a prominent feature. He was observed to be rubbing his hands together during the event. He was able to recognise his wife and correctly reported his address and date of birth to paramedics. The event lasted approximately 10 minutes. On arrival to the emergency department he had a Glasgow Coma Scale score of 13 (E3 M6 V4). A full neurological examination was otherwise normal. What is the most likely diagnosis?

- ☐ Epilepsy
- ☐ Transient psychogenic amnesia
- ☐ Transient global amnesia
- ☐ Brain tumour
- ☐ Transient ischaemic attack

Epilepsy	26%
Transient psychogenic amnesia	12%
Transient global amnesia	48%
Brain tumour	3%
Transient ischaemic attack	11%

The gentleman in this scenario presents with an episode of transient amnesia. The key to this question is distinguishing between transient global amnesia and transient epileptic amnesia.

Transient global amnesia is a clinical syndrome of uncertain aetiology, characterised by a discrete episode lasting for a few hours (always less than 24 hours) of anterograde amnesia, retrograde amnesia, repetitive questioning with an absence of other cognitive or neurological impairments.

Diagnostic criteria (in addition to the above features) are as follows; reliable witness to episode, an absence of head trauma or loss of consciousness at the onset, preserved personal identity and absence of epileptic features.

Epilepsy can present with discreet episodes of amnesia. This syndrome is called transient epileptic amnesia. Features that suggest epilepsy are; shorter duration (should be less than 1 hour), multiple attacks, onset on waking from sleep and accompanying epileptic features - e.g. motor automatism, stereotyped behaviours, limb shaking.

The correct answer is epilepsy rather than transient global amnesia due to the presence of motor automatism (rubbing hands together) and the short duration of the event. The previous stroke may be the underlying cause of his seizure. The mildly reduced score on the Glasgow Coma Scale may indicate a post-ictal state.

Each one of the following is associated with ataxic telangiectasia, except:

- ☐ Telangiectasia
- ☐ Cerebellar ataxia
- ☒ Autosomal dominant inheritance
- ☐ Recurrent chest infections
- ☐ Increased risk of malignancy

Telangiectasia

6%

Cerebellar ataxia

6%

Autosomal dominant inheritance

53%

Recurrent chest infections

16%

Increased risk of malignancy

19%

A 35-year-old man presents to the Emergency Department (ED) with confusion and feeling hot. He has a history of schizophrenia and was recently started on risperidone. He does not smoke or drink alcohol. On examination, he had widespread muscle rigidity and was disoriented to time. His vital signs were heart rate 120/min, blood pressure 150/92 mmHg, respiratory rate 20/min and temperature 37.9°C.

Investigations show myoglobinuria and raised creatine kinase.

In addition to supportive treatments and symptom control, which of the following medications is indicated?

☐ Sodium bicarbonate

☐ Flumazenil

☐ Cyproheptadine

☐ Propranolol

☐ Dantrolene

Sodium bicarbonate	7%
Flumazenil	5%
Cyproheptadine	9%
Propranolol	5%
Dantrolene	74%

Treatment of neuroleptic malignant syndrome - dantrolene

Important for me Less important

This patient has classical features of the neuroleptic malignant syndrome which presents with fever, muscle rigidity, encephalopathy, myoglobinuria, unstable vital signs and raised creatine kinase. It is a rare but serious side effect of antipsychotic drugs. In severe cases, it is treated with dantrolene which acts as an antagonist at the ryanodine receptors decreasing the free intracellular calcium concentration.

Other answers:

- Sodium bicarbonate is used in TCA toxicity
- Flumazenil is rarely used in the management of benzodiazepine toxicity
- Cyproheptadine is used in severe serotonin syndrome
- Propranolol does not have any role as an antidote in serotonin syndrome. Beta blockers can mask tachycardia which is used to monitor the effectiveness of treatment.

Which one of the following is least associated with Miller-Fisher syndrome?

☐ Anti-GQ1b antibodies

☐ Areflexia

☐ Ataxia

☐ Postural hypotension

☐ Ophthalmoplegia

Anti-GQ1b antibodies	12%
Areflexia	12%
Ataxia	14%
Postural hypotension	50%
Ophthalmoplegia	11%

Postural hypotension due to autonomic involvement is not a feature of Miller Fisher syndrome, but may be seen in Guillain-Barre syndrome

A 72-year-old woman with a past history of treated hypertension presents to the Emergency Department. Yesterday she had a 2 hour episode where she couldn't find the right word when speaking. This has never happened before and there were no associated features. Neurological examination is unremarkable and blood pressure was 150/100 mmHg. Her only current medication is amlodipine. What is the most appropriate management?

- ☐ Aspirin 300mg immediately + specialist review within 2 weeks
- ☐ Specialist review within 2 weeks
- ☐ Aspirin 300mg immediately + specialist review within 24 hours
- ☐ Aspirin 75mg + outpatient CT brain
- ☐ Specialist review within 24 hours

Aspirin 300mg immediately + specialist review within 2 weeks

15%

Specialist review within 2 weeks

7%

Aspirin 300mg immediately + specialist review within 24 hours

52%

Aspirin 75mg + outpatient CT brain

11%

Specialist review within 24 hours

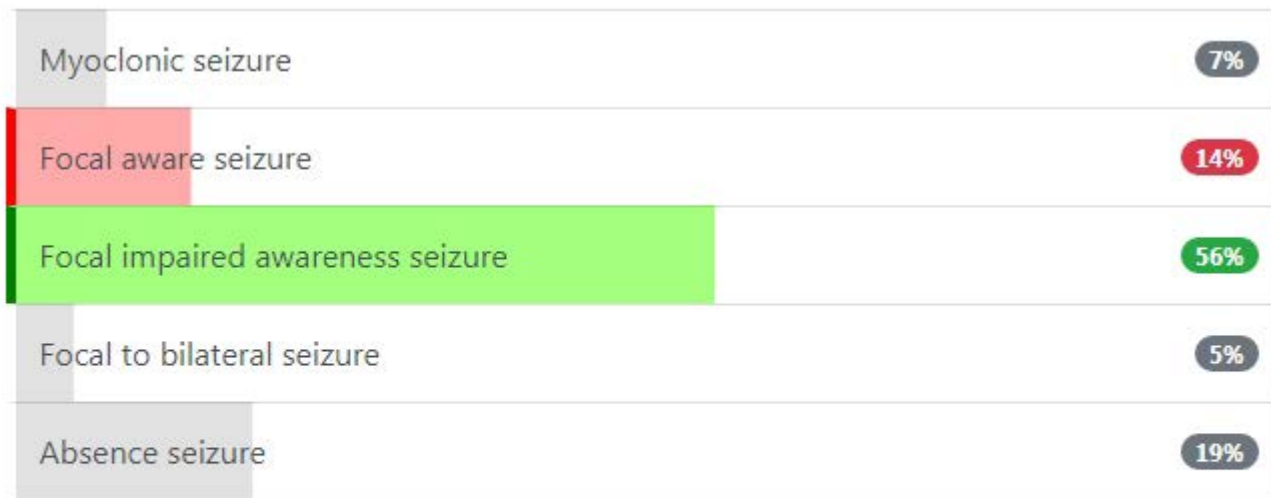
15%

This patient's age, blood pressure and duration of symptoms would put her in a higher risk category. Current guidelines advocate specialist review within 24 hours.

If a patient's symptoms have not fully resolved then aspirin should be withheld until a haemorrhagic stroke has been excluded. As this is a transient ischaemic attack (symptoms last less than 24 hours) aspirin should be given as soon as possible.

A 34-year-old female presents due to a number of 'funny-dos'. She describes a sensation that her surroundings are unreal, 'like a dream'. Following this she has been told that she starts to smack her lips, although she has no recollection of doing this. What is the most likely diagnosis?

- ☐ Myoclonic seizure
- ☐ Focal aware seizure
- ☐ Focal impaired awareness seizure
- ☐ Focal to bilateral seizure
- ☐ Absence seizure



With focal aware seizures there is no disturbance of consciousness or awareness. Lip smacking is an example of an automatism - an automatic, repetitive act

A 78-year-old female has been diagnosed with mild to moderate dementia. Which of the following is an effect of cholinesterase inhibitors?

- ☐ Improvement in physical function
- ☐ Improvement in activities of daily living
- ☐ Longer time before entering residential care
- ☐ Improved mortality
- ☐ Minimize the progression of dementia

Improvement in physical function	11%
Improvement in activities of daily living	51%
Longer time before entering residential care	7%
Improved mortality	4%
Minimize the progression of dementia	27%

Patients with Alzheimer disease have reduced production of choline acetyl transferase, leading to a decrease in acetylcholine synthesis and impaired cortical cholinergic functioning.

The only role for cholinesterase inhibitors is to improve some cognitive function and improvement in activities of daily living. There is no role for cholinesterase inhibitors in advanced Alzheimer's disease.

You review a 47-year-old man in clinic. He has been referred with difficult to control hypertension despite taking a combination of lisinopril, indapamide and amlodipine. Whilst examining the patient you note over 15 large cafe-au-lait spots on his trunk. Some axillary freckling is also present. His blood pressure (despite medication) is 170/94 mmHg and pulse 90/min.

Routine bloods are ordered:

Hb	15.2 g/dl
Platelets	$201 \times 10^9/l$
WBC	$5.2 \times 10^9/l$

Na ⁺	141 mmol/l
K ⁺	4.3 mmol/l
Urea	6.1 mmol/l
Creatinine	88 μ mol/l

Urine dipstick is normal. Which one of the following investigations is most likely to be diagnostic?

- ☐ MRI brain
- ☐ 24 hr urinary cortisol
- ☐ Glucose tolerance test with growth hormone measurements
- ☐ Renal arteriography
- ☐ 24 hr urinary collection of catecholamines

MRI brain	23%
24 hr urinary cortisol	6%
Glucose tolerance test with growth hormone measurements	7%
Renal arteriography	13%
24 hr urinary collection of catecholamines	51%

Patients with neurofibromatosis may develop hypertension for three main reasons:

- coexistent essential hypertension
- phaeochromocytoma
- renal vascular stenosis secondary to fibromuscular dysplasia

The normal renal function in this patient points away from a diagnosis of renal vascular disease. Phaeochromocytoma therefore needs to be excluded first.

A 9-year-old boy is referred to a pediatric neurologist for a headache that has been persistent for the past two months. The mother had initially thought that the boy was having a headache because of school stress but recently the boy has been increasingly involved in accidents while riding his bicycle. The boy says that he could not see his other friends when they rode their bicycle next to him. The boy was born via a Caesarean section and had a normal development so far and is doing well at school. After a thorough examination, the doctor finds that the boy also has a visual defect characterized by an inability to perceive the two temporal visual fields. If this boy undergoes surgery for his condition, which part of this child's hypothalamus would be affected causing weight gain after surgery?

- ☐ Supraoptic nucleus of the hypothalamus
- ☐ Posterior hypothalamus
- ☐ Anterior hypothalamus
- ☐ Ventromedial area of the hypothalamus
- ☐ Paraventricular nucleus of the hypothalamus

Supraoptic nucleus of the hypothalamus	20%
Posterior hypothalamus	13%
Anterior hypothalamus	17%
Ventromedial area of the hypothalamus	38%
Paraventricular nucleus of the hypothalamus	12%

This child presented with the signs and symptoms of a craniopharyngioma. This is a common brain tumor in children and often mimics pituitary adenoma due to the presence of a bitemporal hemianopia in this group of patients. Craniopharyngioma is derived from the Rathke's pouch and it often invades the pituitary and hypothalamus. The ventromedial area of the thalamus is often involved.

- 1: This area of the hypothalamus along with the paraventricular nucleus of the hypothalamus is responsible for the synthesis of antidiuretic hormone and oxytocin, which are transported to the posterior hypothalamus for storage and release.
- 2: The posterior hypothalamus is responsible for heat generation to maintain core body temperature.
- 3: The anterior hypothalamus is responsible for heat dissipation to cool down the body to prevent a rise in temperature which would be detrimental to body's internal environment.
- 4: The ventromedial area of the hypothalamus is often invaded by craniopharyngiomas. This area of the thalamus controls the satiety center and it is removed during surgery, the patient can have uninhibited hunger leading to significant weight gain.
- 5: This area of the hypothalamus along with the supraoptic nucleus of the hypothalamus is responsible for the synthesis of antidiuretic hormone and oxytocin, which are transported to the posterior hypothalamus for storage and release.

A 76 year-old man is brought in to the Emergency Department with confusion, a temperature of 39.9 degrees Celsius and rigidity. From a recent clinic letter you see he lives alone at home and depends on help from his daughter, who has recently had a prolonged stay in hospital for appendicitis. Upon her discharge she went to see him, found him unwell and called 999. She had called him and he had been well the day before. He has a background of hypertension and Parkinson's disease for which he takes ramipril, amlodipine and 'a Parkinson's tablet' which he does not have with him. His chest x-ray and urine dip are clear and he is unable to give a history. A CT brain shows no acute abnormality.

What is the most appropriate intervention?

- ☐ Broad spectrum antibiotics
- ☐ Neurosurgical referral
- ☐ Bromocriptine
- ☐ Intravenous aciclovir
- ☐ Cyproheptadine

Broad spectrum antibiotics

10%

Neurosurgical referral

5%

Bromocriptine

47%

Intravenous aciclovir

7%

Cyproheptadine

31%

The presentation is characteristic of neuroleptic malignant syndrome, but without a history of neuroleptic drug use. In a patient with Parkinson's disease, this raises the question of Parkinsonian malignant syndrome - a similar clinical picture triggered by abrupt withdrawal from antiparkinsonian medication. In this case, the patient is dependent on his daughter bringing in his prescriptions and has run out during her stay in hospital - hence why he does not have the anti-Parkinsonian medication with him. Although the exact pathogenesis of malignant syndrome is not understood, reinitiation of Parkinson's therapy is curative.

Piperacillin and tazobactam therapy would cover a possible sepsis, but is not a typical treatment for a potential central nervous system infection and therefore would be the incorrect choice even if sepsis was the underlying cause of this patient's symptoms. Neurosurgical referral is clearly inappropriate without any clear operative treatment. Intravenous aciclovir is the treatment for herpes simplex encephalitis, which is a differential in this case. It is made less likely only by a lack of any prodromal illness. Cyproheptadine would be a treatment option in serotonin syndrome, but this man is not on any serotonergic drugs and has no reason to have taken any, making this less likely.

A 44-year-old male is seen in Neurology clinic after presenting with a subacute history of a headache. His headache seems to be worse on recumbency and coughing/sneezing.

On examination, upper and lower limbs are normal with intact cranial nerves. On closer examination of the oropharynx, there is evidence of palatal myoclonus. A CT scan confirms a space occupying lesion. Where is the lesion likely located?

- ☐ Temporal lobe
- ☐ Olivary nucleus
- ☐ Parietal lobe
- ☐ Occipital lobe
- ☐ Frontal lobe

Temporal lobe	9%
Olivary nucleus	62%
Parietal lobe	10%
Occipital lobe	9%
Frontal lobe	11%

Palatal myoclonus is a specific feature of hypertrophic olivary degeneration. This is caused by a lesion in the triangle of Guillain and Mollaret (triangle linking the inferior olivary nucleus, red nucleus and the contralateral dentate nucleus). An MRI brain is the gold standard imaging for this lesion.

The other answers are not a part of the triangle of Mollaret.

A 26-year-old male is admitted with sudden onset pain and weakness in both legs just after eating at a Chinese restaurant.

He has no significant past medical history. He works on a construction site and on careful questioning admits using cocaine several times a week.

Examination of the cranial nerves and upper limbs is normal. In the lower limbs his reflexes are present only with reinforcement and the plantar response is ambiguous. There is an ascending pattern of weakness. There is no impairment of light touch sensation or of proprioception.

A CT head scan is reported as normal, as is MRI imaging of the spine done 24 hours after admission normal. He has a mildly raised CRP and a screen for anti-GM1 antibodies is negative.

Which of the following is the most likely diagnosis?

- ☐ Prolapsed lumbar disc
- ☐ Bacillary dysentery
- ☐ Conversion disorder
- ☐ Anterior spinal artery syndrome
- ☐ Guillain-Barre syndrome

Prolapsed lumbar disc

6%

Bacillary dysentery

11%

Conversion disorder

9%

Anterior spinal artery syndrome

31%

Guillain-Barre syndrome

43%

Bilateral spastic paresis and loss of pain and temperature sensation - anterior spinal artery occlusion

Important for me Less important

Sudden onset weakness points to a vascular cause of neurological impairment. Cocaine and other drugs can cause vasospasm which in this case appears to have affected his anterior spinal artery. Recall that during the initial phase of a neurovascular insult, there may be an element of spinal shock which dampens the tendon reflexes.

GBS has a much more sub-acute onset. Bacillary dysentery would not present like this.

A 23-year-old man is admitted to the emergency department following a stabbing incident. He has multiple lacerations to his flank and lower back which have been caused by a knife. After being stabilized he complains of his right leg 'feeling funny.'

You perform a full neurological examination which reveals the following:

- weakness in extension and flexion of the right knee
- loss of proprioception and vibration below mid thigh in the right leg
- loss of pain sensation below the mid thigh in left leg

Given the likely diagnosis, which of the following best describes the trauma?

- ☐ Laceration to right sciatic nerve
- ☐ Hemisection of anterior section of spinal cord
- ☐ Right-sided lateral hemisection of spinal cord
- ☐ Left-sided lateral hemisection of spinal cord
- ☐ Posterior disk prolapse

Laceration to right sciatic nerve	6%
Hemisection of anterior section of spinal cord	17%
Right-sided lateral hemisection of spinal cord	57%
Left-sided lateral hemisection of spinal cord	16%
Posterior disk prolapse	4%

Brown-Sequard syndrome is a result of lateral hemisection of the spinal cord

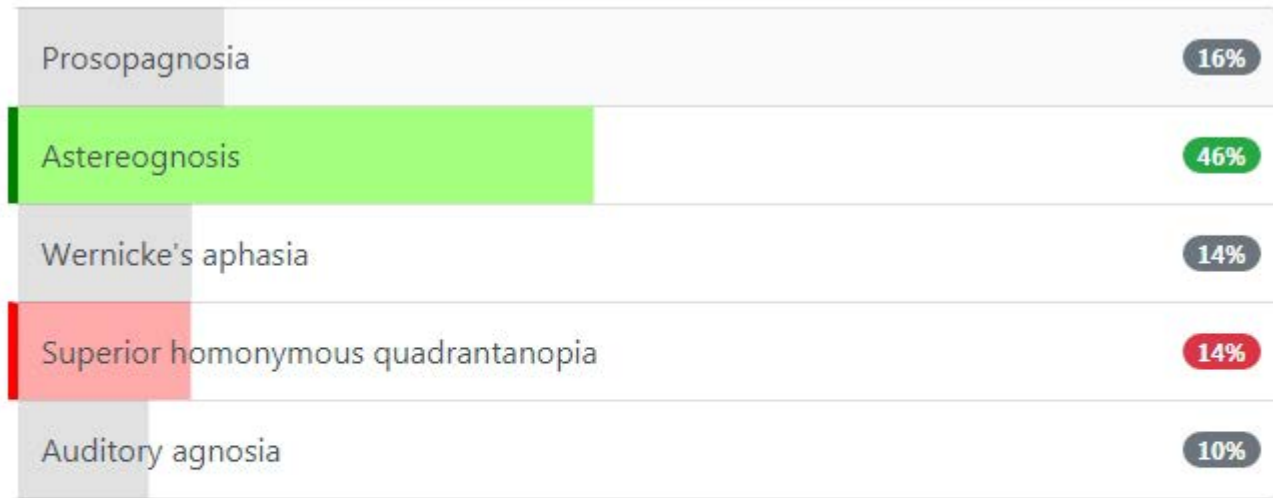
Important for me Less important

The patient has Brown-Sequard syndrome, which is a lateral hemisection of spinal cord. It causes same sided weakness and proprioception/vibration loss and loss of pain/temperature on the opposite side to the hemisection. This is because the pathway for pain/temperature sensation decussates at the level of the nerve root.

Damage to the sciatic nerve would produce unilateral symptoms. Anterior hemisection is rare and unlikely given the mechanism of injury. It would also produce a different distribution of neurological symptoms. A left-sided hemisection would cause ipsilateral weakness. A posterior disk prolapse is also unlikely given the mechanism of trauma.

A 40-year-old man undergoes a temporal lobectomy after the discovery of a brain tumour. Which one of the following consequences would be least likely to develop?

- ☐ Prosopagnosia
- ☐ Astereognosis
- ☐ Wernicke's aphasia
- ☐ Superior homonymous quadrantanopia
- ☐ Auditory agnosia



Parietal lobe lesions may cause astereognosis

Important for me Less important

A 25-year-old male is brought to the emergency department after being struck on the side of the head with a bottle in a nightclub. According to one of his accompanying friends, he was knocked unconscious initially but then regained consciousness. An ambulance was called after the patient lost consciousness again. The admission CT head scan shows an intracranial haemorrhage.

What is the most likely intracranial haemorrhage based on the history?

- ☐ Extradural haematoma
- ☐ Acute subdural haematoma
- ☐ Contusion
- ☐ Concussion
- ☐ Diffuse axonal injury

Extradural haematoma	62%
Acute subdural haematoma	23%
Contusion	6%
Concussion	6%
Diffuse axonal injury	4%

Patients with an intracranial extradural haematoma may experience a lucid interval in which they briefly regain consciousness after the injury before progressing into a coma

Important for me Less important

An extradural haematoma is typically caused by blunt-force, low-impact traumatic head injury. Patients may regain consciousness initially following the injury but progressively slip into a coma as the haematoma continues to expand.

An acute subdural haematoma is typically caused by high-impact injuries (such as a road traffic accident or severe fall) and is often accompanied with diffuse injuries (such as diffuse axonal injury). Patients are either comatose from the outset and do not have the classical lucid interval that is seen in patients with extradural haematomas.

Contusions are a common consequence of traumatic head injury. Over the two to three days following a head injury, contusions can expand and swell (caused by oedema). This effect is termed 'blossoming'. This is a slower process than the neurological deterioration seen in extradural haematoma, which is typically minutes to hours.

Diffuse axonal injury is associated with acceleration and deceleration forces (such as those imposed by a road traffic accident). Coma is of immediate onset and recovery typically takes weeks to months.

A 59-year-old man presents with recurrent attacks of vertigo and dizziness. These attacks are often precipitated by a change in head position and typically last around half a minute. Examination of the cranial nerves and ears is unremarkable. His blood pressure is 120/78 mmHg sitting and 116/76 mmHg standing. Given the likely underlying disorder, what is the most appropriate next step to help confirm the diagnosis?

- ☐ Epley manoeuvre
- ☐ Tilt table test
- ☐ 24 hour ECG monitoring
- ☐ MRI of the cerebellopontine angle
- ☐ Dix-Hallpike manoeuvre

Epley manoeuvre

23%

Tilt table test

8%

24 hour ECG monitoring

3%

MRI of the cerebellopontine angle

4%

Dix-Hallpike manoeuvre

61%

This patient has classical symptoms of benign paroxysmal positional vertigo. A positive Dix-Hallpike manoeuvre is an appropriate next step and would help support the diagnosis.

The change in blood pressure on standing is not significant.

Which one of the following features is most associated with frontal lobe lesions?

- ☐ Wernicke's aphasia
- ☐ Gerstmann's syndrome
- ☐ Perseveration
- ☐ Cortical blindness
- ☐ Superior homonymous quadrantanopia

Wernicke's aphasia

13%

Gerstmann's syndrome

15%

Perseveration

63%

Cortical blindness

5%

Superior homonymous quadrantanopia

4%

Frontal lobe lesions may cause perseveration

Important for me Less important

A 61-year-old woman with a history of metastatic breast cancer complains of nausea following a chemotherapy infusion. You elect to prescribe ondansetron. What is the most important site of action of this drug?

- ☐ Efferent branch of the vagal nerve
- ☐ Substantia nigra
- ☐ Gastric mucosa
- ☐ Hypothalamus
- ☐ Medulla oblongata

Efferent branch of the vagal nerve

10%

Substantia nigra

9%

Gastric mucosa

5%

Hypothalamus

26%

Medulla oblongata

50%

Dr. Arsem

A 50-year-old gentleman presents to clinic with a 20-year history of bilateral upper limb tremor. He has no past medical history. On examination, he has a bilateral symmetrical upper limb postural tremor with no rest or intention tremor. His father had a similar tremor. He has noticed improvement with alcohol. It has become more severe in the past 2 years and he would like treatment. What is the best first line therapy?

- ☐ L-DOPA
- ☐ Deep brain stimulation
- ☐ Primidone
- ☐ Propranolol
- ☐ Botulinum toxin

L-DOPA	6%
Deep brain stimulation	3%
Primidone	10%
Propranolol	77%
Botulinum toxin	3%

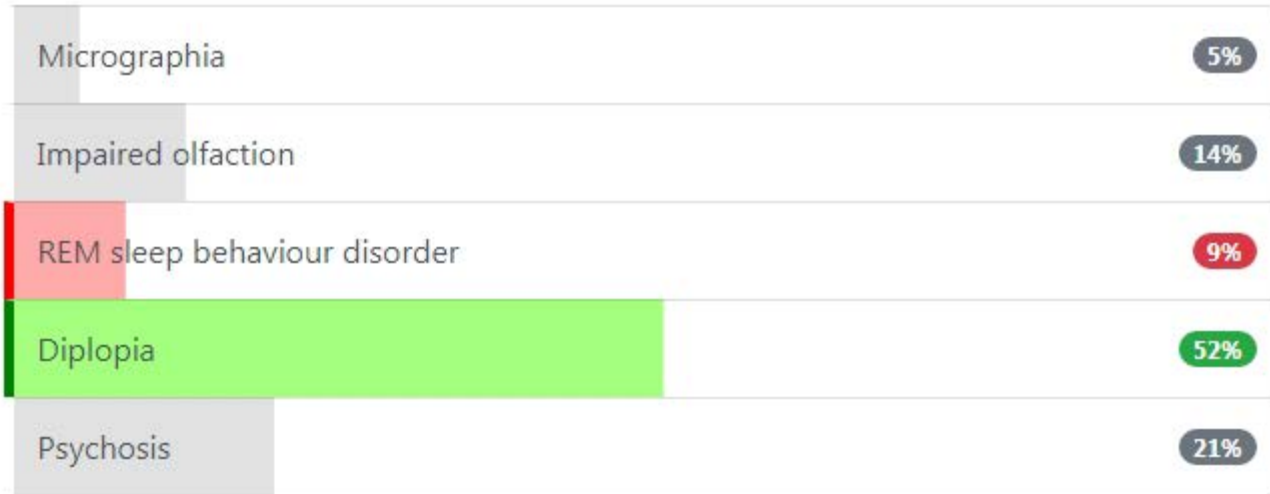
This is a chronic tremor which is confined to the upper limbs, does not occur at rest, responds to alcohol and is associated with a positive family history. The diagnosis is Essential tremor.

L-DOPA is a treatment for Parkinson's disease and has no role here.

Answers 2-5 are all treatments for essential tremor. Propranolol is the first line treatment.

A 72-year-old man who is being treated for Parkinson's disease is reviewed. Which one of the following features should prompt you to consider an alternative diagnosis?

- ☐ Micrographia
- ☐ Impaired olfaction
- ☐ REM sleep behaviour disorder
- ☐ Diplopia
- ☐ Psychosis



Diplopia is not common in Parkinson's disease and may suggest an alternative cause of parkinsonism such as progressive supranuclear palsy

A 49-year-old man is prescribed procyclidine for Parkinson's disease. What is the mechanism of action?

- ☐ Antimuscarinic
- ☐ Dopamine receptor agonist
- ☐ Decarboxylase inhibitor
- ☐ Dopamine receptor antagonist
- ☐ Monoamine Oxidase-B inhibitor

Antimuscarinic

59%

Dopamine receptor agonist

12%

Decarboxylase inhibitor

9%

Dopamine receptor antagonist

7%

Monoamine Oxidase-B inhibitor

13%

Procyclidine - antimuscarinic

Important for me Less important

A 27-year-old man presents with a history of fits consistent with tonic-clonic seizures. What is the most suitable first-line treatment?

- ☐ Gabapentin
- ☐ Lamotrigine
- ☐ Sodium valproate
- ☐ Carbamazepine
- ☐ Phenytoin

Gabapentin

3%

Lamotrigine

5%

Sodium valproate

82%

Carbamazepine

6%

Phenytoin

4%

Epilepsy medication: first-line

- generalised seizure: sodium valproate
- focal seizure: carbamazepine

Important for me

Less important

A 68-year-old female patient presents to the memory clinic, accompanied by her family, with a 6 months history of rapidly declining cognitive function. Her family reports that her short-term memory has significantly deteriorated during the period. There is also increasing emotional lability and change in personality. They also noticed frequent jerking movement of the arms. On examination, there is significant dysphasia, agnosia and apraxia. Myoclonus was observed but the rest of the neurological examinations are unremarkable. There is significant cognitive and functional impairment. Her past medical history of unremarkable. There is a family history of Alzheimer's disease.

What is the most likely diagnosis?

- ☐ Alzheimer's dementia
- ☐ Progressive supranuclear palsy
- ☐ Creutzfeldt-Jakob Disease
- ☐ Corticobasal degeneration
- ☐ Vascular dementia

Alzheimer's dementia

11%

Progressive supranuclear palsy

13%

Creutzfeldt-Jakob Disease

56%

Corticobasal degeneration

13%

Vascular dementia

7%

Creutzfeldt-Jakob disease is characterised by rapid onset dementia and myoclonus

Important for me Less important

Creutzfeldt-Jakob disease is one of the prion diseases characterised by the rapid onset of dementia and myoclonus. The jerking movements in the arms are myoclonus.

The onset is too rapid for Alzheimer's dementia and the presence of myoclonus raises the suspicion of CJD.

Progressive supranuclear palsy does not usually present with myoclonus. It is likely to present with parkinsonism and/or cerebellar signs.

Corticobasal degeneration is likely to present with parkinsonism.

There is no mention of any vascular risk factors hence this is not as likely.

A 69-year-old man is diagnosed as having Parkinson's disease. Which one of the following psychiatric problems is most likely to occur in this patient?

☐ Tics

☐ Psychosis

☐ Mania

☐ Dementia

☐ Depression



Parkinson's disease - most common psychiatric problem is depression

Important for me Less important

Whilst dementia is common in patients with Parkinson's disease depression is known to exist in around 40%

A 60-year-old man is diagnosed with Bell's palsy. What is the current evidenced base approach to the management of this condition?

- ☐ Refer for urgent surgical decompression
- ☐ Aciclovir
- ☐ No treatment
- ☐ Aciclovir + prednisolone
- ☐ Prednisolone

Refer for urgent surgical decompression

4%

Aciclovir

5%

No treatment

13%

Aciclovir + prednisolone

18%

Prednisolone

60%

A 34-year-old man is reviewed in the neurology clinic. He has been established on sodium valproate for primary generalised epilepsy. Despite now taking a therapeutic dose he continues to have seizures and is troubled by weight gain since starting sodium valproate. He asks to stop his current medication and try a different drug. Which one of the following drugs would be the most appropriate second-line treatment?

- ☐ Lamotrigine
- ☐ Ethosuximide
- ☐ Pregabalin
- ☐ Gabapentin
- ☐ Tiagabine

Lamotrigine	85%
Ethosuximide	7%
Pregabalin	2%
Gabapentin	3%
Tiagabine	3%

Monotherapy with another drug should be attempted before combination therapy is started. Caution should be exercised when combining sodium valproate and lamotrigine as serious skin rashes such as Steven-Johnson's syndrome may be provoked

A 42-year-old gentleman is seen in General Practice with double vision, weakness and a dry mouth.

He has a known history of type 1 diabetes, hypothyroidism and small cell lung cancer.

On examination, you note a bilateral ptosis and proximal muscle weakness in the upper limbs with absent reflexes. With sustained isometric contraction of the upper limbs, you note an improvement in the weakness. He also has weakness of neck flexion and eyelid elevation after sustained upgaze.

What is the likely autoantibody associated with this condition?

- ☐ Anti-Musk antibody
- ☐ Anti-mitochondrial antibody
- ☐ Anti-voltage-gated calcium channel antibody
- ☐ Anti-Jo1 antibody
- ☐ Anti-Mi2 antibody

Anti-Musk antibody	10%
Anti-mitochondrial antibody	7%
Anti-voltage-gated calcium channel antibody	69%
Anti-Jo1 antibody	9%
Anti-Mi2 antibody	5%

This is a case of Lambert-Eaton myasthenic syndrome which is characterised by a potentiation effect whereby increased activity enhances muscle power. The voltage-gated calcium channel antibody is present in 85-95% of patients.

Anti-Musk is associated with myasthenia gravis patients, anti-Jo1 and anti-Mi2 with inflammatory myositis, and anti-mitochondrial antibody with primary biliary cirrhosis.

A 68-year-old woman presents with a two month history of electric shock like pains on the right side of her face. She describes having around 10-20 episodes a day which, each lasting for around 30-60 seconds. A recent dental check was normal. Neurological examination is unremarkable. What is the most suitable first-line management?

- ☐ Amitriptyline
- ☐ Sodium valproate
- ☐ Carbamazepine
- ☐ Atenolol
- ☐ Zolmitriptan

Amitriptyline

28%

Sodium valproate

4%

Carbamazepine

57%

Atenolol

4%

Zolmitriptan

8%

Trigeminal neuralgia - carbamazepine is first-line

Important for me Less important

A 67-year-old man presents to his GP with numbness in his feet and recurrent falls over the past month. He describes difficulty walking. His GP recently started him on folate for a macrocytic anaemia. He takes no other regular medications. He does not drink alcohol. On examination, he has an ataxic gait and Romberg's test is positive. Examination of his lower limbs demonstrates an increase in tone and bilateral weakness. He has absent ankle and knee jerks with upgoing plantars. Light touch and vibration sense is reduced bilaterally.

What is the most likely cause of his symptoms?

- ☐ Amyotrophic lateral sclerosis
- ☐ Guillain-Barre syndrome
- ☐ Subacute combined degeneration of the cord
- ☐ Myasthenia gravis
- ☐ Charcot-Marie-Tooth disease

Amyotrophic lateral sclerosis	15%
Guillain-Barre syndrome	4%
Subacute combined degeneration of the cord	70%
Myasthenia gravis	3%
Charcot-Marie-Tooth disease	9%

Always replace vitamin B12 before folate - giving folate to a patient deficient in B12 can precipitate subacute combined degeneration of the cord

Important for me Less important

Subacute combined degeneration of the cord involves degeneration of the posterior and lateral columns of the spinal cord, often due to vitamin B12 deficiency.

- Damage to the posterior columns - loss of proprioception, light touch and vibration sense (sensory ataxia and a positive Romberg's test).
- Damage to lateral columns - spastic weakness and upgoing plantars (UMN signs).
- Damage to peripheral nerves - absent ankle and knee jerks (LMN signs).

When there is a mix of UMN and LMN signs in a patient, always consider SCDC.

Replacing folate without vitamin B12 (hinted at in this case) can precipitate subacute combined degeneration of the cord in a patient who is vitamin B12 deficient. **Always ensure vitamin B12 levels are checked (and replenished) before giving folate for a macrocytic anaemia.**

Amyotrophic lateral sclerosis is a subtype of motor neurone disease. This may present with mixed UMN and LMN signs but no associated sensory deficits.

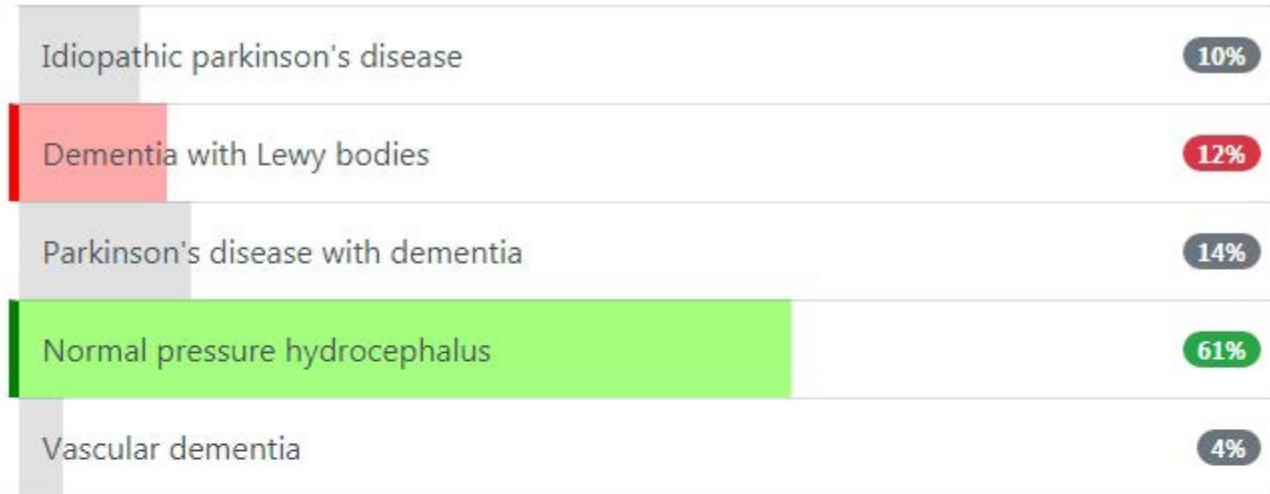
Guillain-Barre syndrome is an inflammatory **peripheral** neuropathy so will not present with UMN signs. There is nothing in the history to suggest a recent bacterial or viral infection.

Myasthenia gravis is an autoimmune disease affecting the **neuromuscular junction** so will not present with UMN signs or sensory loss.

Charcot-Marie-Tooth disease is a hereditary sensory and motor **peripheral** neuropathy. UMN signs are not present in these patients. However, patients can present with LMN signs in all limbs and reduced sensation (more pronounced distally).

A 65-year-old lady presents to clinic with a 6-month history of walking difficulty. She offers a more recent history of urinary urgency. Examination reveals a short, shuffling gait, mild bilateral, postural upper limb tremor, and extensor plantar response. She scored 20/30 on an MMSE. What is the most likely diagnosis?

- ☐ Idiopathic parkinson's disease
- ☐ Dementia with Lewy bodies
- ☐ Parkinson's disease with dementia
- ☐ Normal pressure hydrocephalus
- ☐ Vascular dementia



This case conforms to the classical triad of NPH.

In idiopathic Parkinson's disease, you would expect to see a unilateral upper limb onset

Dementia with Lewy bodies and Parkinson's disease with dementia both present with cognitive impairment and parkinsonism. In the former, the cognitive impairment precedes the motor manifestations or occurs within 1 year of the onset of motor manifestations

A 56-year-old woman presents with facial asymmetry. Whilst brushing her teeth this morning she noted that the right hand corner of her mouth was drooping. She is generally well but noted some pain behind her right ear yesterday and says her right eye is becoming dry. On examination she has a complete paralysis of the facial nerve on the right side, extending from the forehead to the mouth. Ear, nose and throat examination is normal. Clinical examination of the peripheral nervous system is normal. What is the most likely diagnosis?

☐ Ramsey-Hunt syndrome

☐ Bell's palsy

☐ Stroke

☐ Multiple sclerosis

☐ Parotid tumour

Ramsey-Hunt syndrome

22%

Bell's palsy

66%

Stroke

5%

Multiple sclerosis

3%

Parotid tumour

4%

The pain around the ear raises the possibility of Ramsey-Hunt syndrome but this is actually quite common in Bell's palsy - some studies suggest it is seen in 50% of patients. The normal ear exam also goes against this diagnosis.

Which of the following is least recognised as a cause of macroglossia?

- ☐ Amyloidosis
- ☐ Turner's syndrome
- ☐ Duchenne muscular dystrophy
- ☐ Acromegaly
- ☐ Hurler syndrome

Amyloidosis

13%

Turner's syndrome

33%

Duchenne muscular dystrophy

36%

Acromegaly

5%

Hurler syndrome

13%

A 65-year-old gentleman presents with progressive dementia and behavioural abnormalities. On closer questioning, he seems to have deficits in concentration, memory and judgement difficulties. There is a family history of psychosis. During the consultation, you notice the patient's gait is ataxic with a notable jerk of his left hand and general hypokinesia. There is also nystagmus during horizontal gaze. Romberg's and Dix-Hallpike tests are negative. What is the most likely diagnosis?

- ☐ Vascular dementia
- ☐ Lewy body dementia
- ☐ Sporadic Creutzfeldt-Jakob disease
- ☐ Alzheimer's disease
- ☐ Frontotemporal dementia

Vascular dementia	6%
Lewy body dementia	23%
Sporadic Creutzfeldt-Jakob disease	46%
Alzheimer's disease	5%
Frontotemporal dementia	20%

The clue here is the 'notable jerk' found on examination consistent with myoclonus. Two cardinal features of sporadic Creutzfeldt-Jakob disease (sCJD) are rapidly progressive mental deterioration and myoclonus (usually provoked by startle). Extrapyrimal and cerebellar features occur in two-thirds of cases. The question hints at a familial link which is present in 10-15% of cases, or a general family history of psychosis (OR 9.9) has been shown to be associated with the disease.

Lewy body dementia, Alzheimer's disease, and vascular dementia would not account for the myoclonus nor the cerebellar features. Frontotemporal dementia tends to present with a history of disinhibition, apathy, loss of sympathy/empathy, compulsive behaviours and hyperorality.

A 25-year-old female with a history of bilateral vitreous haemorrhage is referred due to progressive ataxia. What is the likely diagnosis?

- ☐ Neurofibromatosis type I
- ☐ Neurofibromatosis type II
- ☐ Tuberose sclerosis
- ☐ Von Hippel-Lindau syndrome
- ☐ Sarcoidosis



Retinal and cerebellar haemangiomas are key features of Von Hippel-Lindau syndrome. Retinal haemangiomas are bilateral in 25% of patients and may lead to vitreous haemorrhage

A 65-year-old man is referred to the neurology outpatient clinic due to a resting tremor of his right hand. A diagnosis of Parkinson's disease is made. He is otherwise well and is not currently disabled by his symptoms. What is the most appropriate treatment?

- ☐ Amantadine
- ☐ No treatment
- ☐ New generation dopamine receptor agonist e.g. ropinirole
- ☐ Conventional dopamine receptor agonist e.g. bromocriptine
- ☐ Antimuscarinics

Amantadine	5%
No treatment	40%
New generation dopamine receptor agonist e.g. ropinirole	35%
Conventional dopamine receptor agonist e.g. bromocriptine	10%
Antimuscarinics	10%

Following the NICE 2017 guidelines, it is now recommended to use a dopamine receptor agonist for motor symptoms that are not affecting a patient's quality of life.

Which one of the following is least recognised as causing idiopathic intracranial hypertension?

☐ Oral contraceptive pill

☐ Tetracycline

☐ Ciclosporin

☐ Prednisolone

☐ Vitamin A

Oral contraceptive pill

9%

Tetracycline

14%

Ciclosporin

37%

Prednisolone

18%

Vitamin A

22%

A 64-year-old man with a history of Parkinson's disease is reviewed in clinic and a decision has been made to start him on cabergoline. Which one of the following adverse effects is most strongly associated with this drug?

- ☐ Optic neuritis
- ☐ Transient rise in liver function tests
- ☐ Pulmonary fibrosis
- ☐ Renal failure
- ☐ Thrombocytopenia

Optic neuritis

8%

Transient rise in liver function tests

14%

Pulmonary fibrosis

64%

Renal failure

5%

Thrombocytopenia

9%

Which one of the following is least likely to cause a raised protein level in the cerebrospinal fluid?

- ☐ Tuberculous meningitis
- ☐ Guillain-Barre syndrome
- ☐ Fungal meningitis
- ☐ Froin's syndrome
- ☐ Systemic lupus erythematosus

Tuberculous meningitis

11%

Guillain-Barre syndrome

22%

Fungal meningitis

15%

Froin's syndrome

20%

Systemic lupus erythematosus

32%

A 27-year-old woman is reviewed due to sudden loss of vision in her left eye. She is known to have severe rheumatoid arthritis and is treated currently with methotrexate, infliximab and prednisolone. She has in the past also used sulfasalazine and hydroxychloroquine. For the past 6 weeks she has developed troublesome headaches. Examination demonstrates bilateral papilloedema. Which one of the following is most likely to be responsible for this presentation?

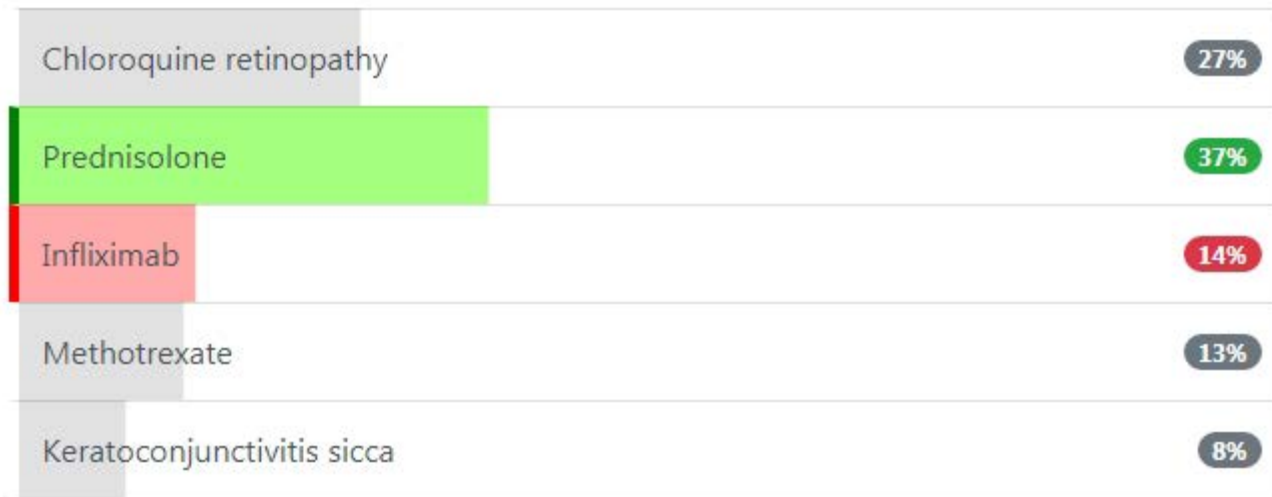
☐ Chloroquine retinopathy

☐ Prednisolone

☐ Infliximab

☐ Methotrexate

☐ Keratoconjunctivitis sicca



This patient has developed intracranial hypertension probably secondary to prednisolone. Patients may lose sight suddenly if the optic nerve becomes compressed

You are a CT1 in Acute Medicine covering a general medical ward at night. You are asked to see a 60-year-old patient with known myasthenia gravis who is complaining of increased breathlessness and fatigue. Which of the following antibiotics is most likely to be responsible for a myasthenic crisis?

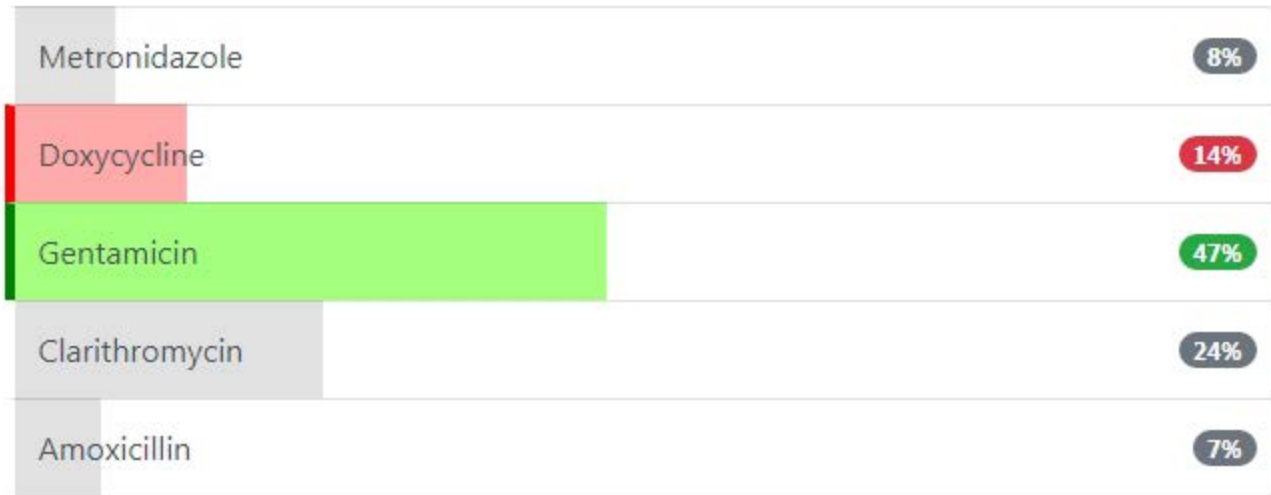
☐ Metronidazole

☐ Doxycycline

☐ Gentamicin

☐ Clarithromycin

☐ Amoxicillin



This question asks which antibiotic is the most likely cause of an exacerbation. Although macrolides, tetracyclines, and metronidazole are occasionally associated with exacerbation in myasthenic patients, they are usually well tolerated in this population.

Aminoglycosides, including gentamicin, are relatively contra-indicated in myasthenia as they are more commonly associated with exacerbations. The mechanism is thought to be competitive inhibition of the release of acetylcholine at the presynaptic membrane of the neuromuscular junction.

Amoxicillin is generally considered to be safe in myasthenia gravis.

Dr Assem

A 65-year-old man with a history of Parkinson's disease is referred to the respiratory clinic with shortness of breath. He has never smoked. Spirometry is performed:

	Percentage predicted
FEV1	71%
FVC	74%

Which one of the following drugs is most likely to be responsible?

- ☐ Levodopa
- ☐ Entacapone
- ☐ Ropinirole
- ☐ Selegiline
- ☐ Pergolide



This patient has developed pulmonary fibrosis (explaining the restrictive picture on spirometry) secondary to pergolide therapy

Which one of the following is most associated with downbeat nystagmus?

- ☐ Arnold-Chiari malformation
- ☐ Pseudobulbar palsy
- ☐ Jugular foramen syndrome
- ☐ Acoustic neuroma
- ☐ Cerebellar vermis lesions

Arnold-Chiari malformation

41%

Pseudobulbar palsy

16%

Jugular foramen syndrome

7%

Acoustic neuroma

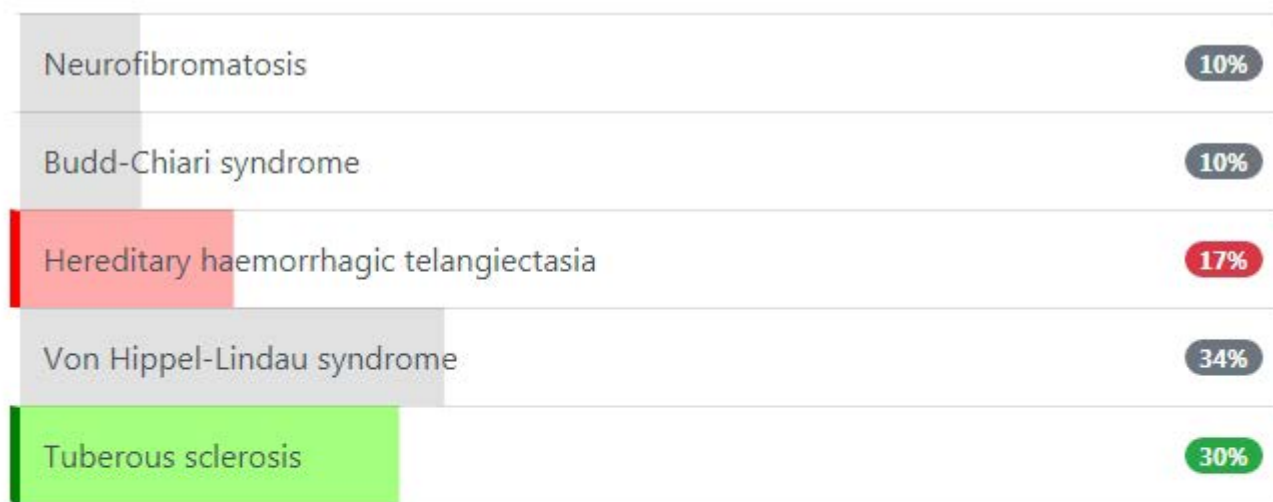
10%

Cerebellar vermis lesions

25%

A 35-year-old female is admitted to hospital with hypovolaemic shock. CT abdomen reveals a haemorrhagic lesion in the right kidney. Following surgery and biopsy this is shown to be an angiomyolipoma. What is the most likely underlying diagnosis?

- ☐ Neurofibromatosis
- ☐ Budd-Chiari syndrome
- ☐ Hereditary haemorrhagic telangiectasia
- ☐ Von Hippel-Lindau syndrome
- ☐ Tuberous sclerosis



Around 1 in 10 people who are diagnosed with a renal angiomyolipoma have underlying tuberous sclerosis. Conversely, most patients with tuberous sclerosis will have several renal angiomyolipomata affecting both kidneys.

The other conditions are not linked with renal angiomyolipomata.

Which of the following statements is most accurate regarding the usefulness of cervical spine radiographs (X-rays) in the assessment of degenerative cervical myelopathy (DCM)?

- ☐ Cervical spine radiographs should be obtained in all patients suspected of having DCM
- ☐ Where DCM is suspected, AP (anteroposterior), lateral and oblique cervical spine radiographs should be requested
- ☐ Cervical spine radiographs are a useful first line investigation where a diagnosis of DCM is suspected
- ☐ Cervical spine radiographs have a low sensitivity but high specificity for DCM
- ☐ Cervical spine radiographs cannot diagnose DCM

Cervical spine radiographs should be obtained in all patients suspected of having DCM	7%
Where DCM is suspected, AP (anteroposterior), lateral and oblique cervical spine radiographs should be requested	10%
Cervical spine radiographs are a useful first line investigation where a diagnosis of DCM is suspected	16%
Cervical spine radiographs have a low sensitivity but high specificity for DCM	8%
Cervical spine radiographs cannot diagnose DCM	58%

Radiographs are of limited value where a diagnosis of degenerative cervical myelopathy is suspected [1] as they cannot visualise the soft tissue, such as the spinal cord.

Spine radiographs have a high sensitivity, but limited specificity to diagnose most spinal conditions. Oblique spine radiographs are usually requested in the lumbar spine region to pick up defects in the pars interarticularis. They have no value in setting of DCM.

The finding of spondylosis is common in spinal x-rays of adults over 40 [2]. Its absence does not exclude neural compression.

Degenerative Cervical Myelopathy [DCM] is spinal cord compression due to degenerative changes of the surrounding spinal structures; e.g. from disc herniation, ligament hypertrophy or calcification, or osteophytes. Therefore in order to visualise these structures, a MRI is gold standard and first line.

Again the presence of such degenerative changes is common on MRI; in one study, 57% of patients older than 64 years of age had disc bulging, though only 26% had spinal cord compression [3]. Therefore a diagnosis of DCM requires the finding of MRI compression in concert with appropriate signs and symptoms.

References

1. Nouri A, Tetreault L, Singh A, Karadimas SK, Fehlings MG. Degenerative Cervical Myelopathy: Epidemiology, Genetics, and Pathogenesis. Spine (Phila Pa 1976). 2015 Jun 15;40(12):E675-93.
2. Baron EM, Young WF. Cervical spondylotic myelopathy: a brief review of its pathophysiology, clinical course, and diagnosis. Neurosurgery. 2007 Jan;60(1 Suppl 1):S35-41.
3. Teresi LM, Lufkin RB, Reicher MA, Moffit BJ, Vinuela FV, Wilson GM, Bentson JR, Hanafee WN: Asymptomatic degenerative disk disease and spondylosis of the cervical spine: MR imaging. Radiology 164:8388, 1987.

A 75-year old gentleman presents with a short history of neck pain, paraesthesia in his finger tips and progressive leg weakness. Following a MRI scan of his spine, he is diagnosed with degenerative cervical myelopathy due to a C4/5 disc prolapse. Which of the following is the most appropriate management?

- ☐ Cervical decompressive surgery
- ☐ Cervical nerve root injection
- ☐ Analgesia and referral to physiotherapy
- ☐ Analgesia and review in 4 weeks time
- ☐ Analgesia, a hard cervical collar and review in 4 weeks

Cervical decompressive surgery	81%
Cervical nerve root injection	3%
Analgesia and referral to physiotherapy	7%
Analgesia and review in 4 weeks time	3%
Analgesia, a hard cervical collar and review in 4 weeks	6%

All patients with degenerative cervical myelopathy should be urgently referred for assessment by specialist spinal services (neurosurgery or orthopaedic spinal surgery). This is due to the importance of early treatment. The timing of surgery is important, as any existing spinal cord damage can be permanent. Early treatment (within 6 months of diagnosis) offers the best chance of a full recovery but at present, most patients are presenting too late. In one study, patients averaged over 5 appointments before diagnosis, representing >2 years [1].

Currently, decompressive surgery is the only effective treatment. It has been shown to prevent disease progression. Close observation is an option for mild stable disease, but anything progressive or more severe requires surgery to prevent further deterioration. Physiotherapy should only be initiated by specialist services, as manipulation can cause more spinal cord damage.

Prompt diagnosis and onward referral are therefore key to ensuring good outcome for your patients. There are national initiatives to raise awareness of the condition to try and improve referral times (www.myelopathy.org). All of the other listed options in this question do not control the patients primary pathology.

References:

1. Behrbalk E, Salame K, Regev GJ, et al. Delayed diagnosis of cervical spondylotic myelopathy by primary care physicians. *Neurosurg Focus* 2013;35:E1. doi:10.3171/2013.3.FOCUS1374

A 76-year-old man is reviewed in the Elderly Medicine clinic. He is concerned about his increasing forgetfulness over the past six months. His daughter notes he has generally 'slowed down' and struggles to follow conversations. Over the past month he has noted increasingly frequent episodes of urinary incontinence. He has also had one episode of faecal incontinence in the past week. On examination he is noted to have brisk reflexes and a short, shuffling gait. No cerebellar signs are noted. What is the most likely diagnosis?

- ☐ Multiple system atrophy
- ☐ Parkinson's disease
- ☐ Normal pressure hydrocephalus
- ☐ Urinary tract infection
- ☐ Pick's disease

Multiple system atrophy	18%
Parkinson's disease	10%
Normal pressure hydrocephalus	65%
Urinary tract infection	2%
Pick's disease	5%

Urinary incontinence + gait abnormality + dementia = normal pressure hydrocephalus

Important for me Less important

The presence of dementia and absence of cerebellar signs point away from a diagnosis of multiple system atrophy

A 54-year-old man is admitted to the Emergency Department with a left hemiplegia. His symptoms started around 5 hours ago and he has had no headache, visual disturbance or loss of consciousness. On examination a dense left hemiplegia is noted. Blood pressure is 120/78 mmHg, GCS is 15/15 and pupils are equal and reactive to light. An urgent CT scan is performed shortly after his arrival. This demonstrates no abnormality. What is the most appropriate initial management?

- ☐ Enoxaparin
- ☐ Alteplase
- ☐ Dexamethasone
- ☐ Warfarin
- ☐ Aspirin



Stroke thrombolysis - only consider if less than 4.5 hours and haemorrhage excluded

Important for me Less important

This patient has had an ischaemic stroke. He is however outside the thrombolytic window and should therefore be treated with aspirin

A 67-year-old male attends the Emergency department with sudden onset dizziness and vomiting, which has been present for the past 2 hours. He has a background of hypertension and hypercholesterolaemia for which he takes ramipril and simvastatin. Examination reveals vertical nystagmus and difficulty standing without support. What is the most appropriate next step in this patient's management?

- ☐ Prochlorperazine 12.5 mg IM
- ☐ Arrange immediate admission for thrombolysis
- ☐ Urgent CT head
- ☐ Sumatriptan 50 mg PO
- ☐ Perform the Epley manoeuvre

Prochlorperazine 12.5 mg IM	9%
Arrange immediate admission for thrombolysis	6%
Urgent CT head	72%
Sumatriptan 50 mg PO	3%
Perform the Epley manoeuvre	11%

This history is suggestive of a cerebellar stroke. Circulation to the cerebellum is impaired due to a lesion of the superior cerebellar artery, anterior inferior cerebellar artery or the posterior inferior cerebellar artery (also known as lateral medullary syndrome). The first step would be determine any evidence of cerebellar haemorrhage, which would contraindicate thrombolysis. MRI will be better able to visualise cerebellar infarction.

Cerebellar stroke may present in a similar fashion to vestibular neuritis. Clinically, vertical nystagmus is suggestive of a central cause of vertigo. Additionally, patients usually cannot stand without support, even with the eyes open, whereas a patient with acute vestibular neuritis is usually able to do so.

Benign paroxysmal positional vertigo (BPPV) is a very common cause of vertigo in older people. It is characterised by severe, brief paroxysms of rotational vertigo provoked by positional changes. In contrast to this case, vertigo usually lasts a few seconds to a minute (typically less than 30 seconds).

Migraine is a another common cause of vertigo, however given this patient's age and cardiovascular risk factors, stroke is more likely and the important diagnosis not to miss.

An 80-year-old man presents to the Emergency Department reporting that he awoke this morning with dizziness and vomiting. On further questioning, you establish that he has a sensation of the room spinning around him, which is worse when he moves his head quickly, although persists with his head still, and that he vomits when these symptoms are at their most severe. He is unsteady on his feet and staggers when you try to walk him around his bed. He has no other symptoms or signs. He has a past medical history of hypertension, high cholesterol, type II diabetes which is diet controlled, and osteoarthritis.

Which of the following diagnoses is it most important to exclude?

- ☐ Posterior circulation stroke
- ☐ Postural hypotension
- ☐ Benign paroxysmal positional vertigo
- ☐ Meningo-encephalitis
- ☐ Viral labyrinthitis

Posterior circulation stroke	66%
Postural hypotension	3%
Benign paroxysmal positional vertigo	22%
Meningo-encephalitis	3%
Viral labyrinthitis	7%

Posterior circulation stroke must always be considered as a differential in a patient presenting with acute vertigo

Important for me Less important

A central cause of vertigo must always be considered. Central causes include posterior circulation stroke, acoustic neuroma and other benign and malignant brain tumours, and multiple sclerosis. Stroke is the most urgent diagnosis to make, and the most likely in this patient with cardiovascular risk factors.

A posterior circulation stroke affects the brain tissue supplied by the vertebral, basilar or posterior cerebral arteries - which includes the brainstem, cerebellum, thalamus, midbrain, and parts of the temporal and occipital cortex. Posterior circulation strokes account for 20-25% of ischaemic strokes in the UK but are more difficult to diagnose than anterior circulation strokes. Symptoms can include dizziness, vomiting, double vision, dysarthria, dysphagia, ataxia, limb weakness and visual field defects.

BMJ Clinical Review - posterior circulation stroke

<http://www.bmj.com/content/348/bmj.g3175>

Dr Assem

A 42-year-old woman falls off her horse and sustains a head injury. A CT scan on admission to the Emergency Department demonstrates a skull fracture and an associated extra-dural haematoma overlying the left parietal lobe. She has a Glasgow coma score of 12; E3 V4 M5, on arrival with no apparent neurological deficits. At the time both pupils are 4mm in diameter with intact pupillary light responses. She deteriorates within an hour to a Glasgow coma score of 8; E2 V2 M4. Her left pupil is now fixed at 7mm and her right pupil is 3mm and reacts to light. Additionally, her left eye is deviated inferiorly and away from the midline.

What is the most likely pathology responsible for her clinical findings?

- ☐ Trans-tentorial herniation
- ☐ Cerebellar tonsillar herniation
- ☐ Posterior communicating artery aneurysm
- ☐ Frontal eye field injury
- ☐ Optic nerve compression

Trans-tentorial herniation	45%
Cerebellar tonsillar herniation	21%
Posterior communicating artery aneurysm	21%
Frontal eye field injury	4%
Optic nerve compression	9%

Raised ICP can cause a third nerve palsy due to herniation

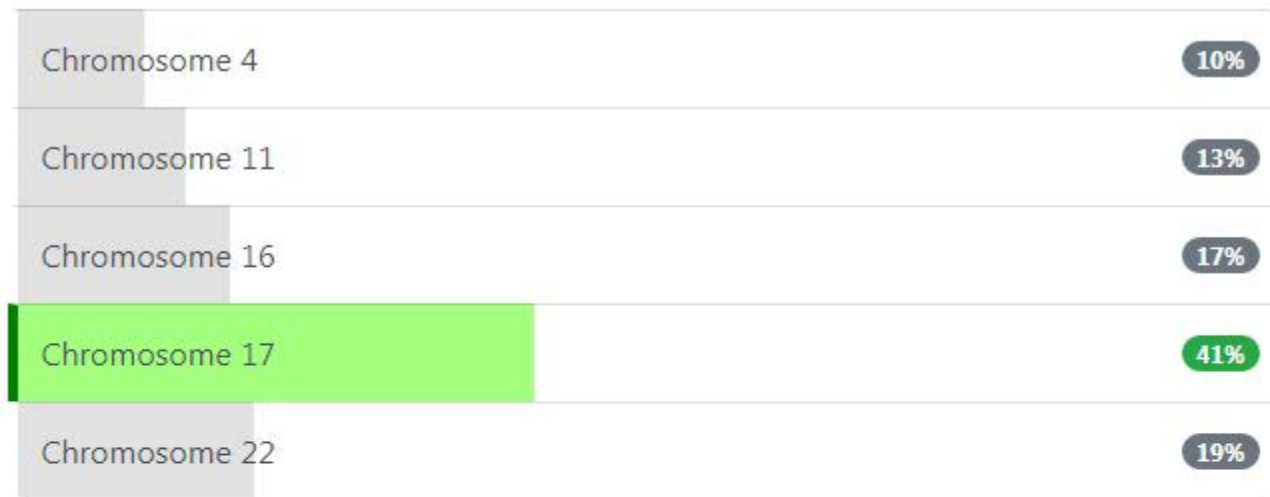
Important for me [Less important](#)

The combination of a fixed and dilated pupil with an eye deviated inferiorly and laterally ('down and out') is indicative of a third nerve palsy. In the context of a decreasing conscious level and an intracranial mass (the haematoma) this is indicative of a trans-tentorial, or uncal, herniation.

Cerebellar tonsillar herniation affects the medulla oblongata and is often a terminal event in an unconscious patient resulting in asystolic cardio-respiratory arrest. Although a classical cause of a third nerve palsy, a posterior communicating artery aneurysm is not the most likely cause here given the history of trauma and an intracranial mass. Frontal eye field injury would cause a functional ocular paralysis and the eye would tend to the neutral position in a state of reduced consciousness. Optic nerve compression would not cause deviation of the eye.

A 17-year-old man is referred to dermatology. He has around 10 hyperpigmented macules on his torso which vary in size from 1.5-5 cm in size. His GP also noted some freckles in the groin region. He is also currently under orthopaedic review due to a worsening scoliosis of the spine. His father suffered from similar problems before having a fatal myocardial infarction two years ago. Which chromosome is most likely to have a gene defect?

- ☐ Chromosome 4
- ☐ Chromosome 11
- ☐ Chromosome 16
- ☐ Chromosome 17
- ☐ Chromosome 22



Neurofibromatosis type 1 - chromosome 17

Important for me [Less important](#)

This patient meets the diagnostic criteria for NF1.

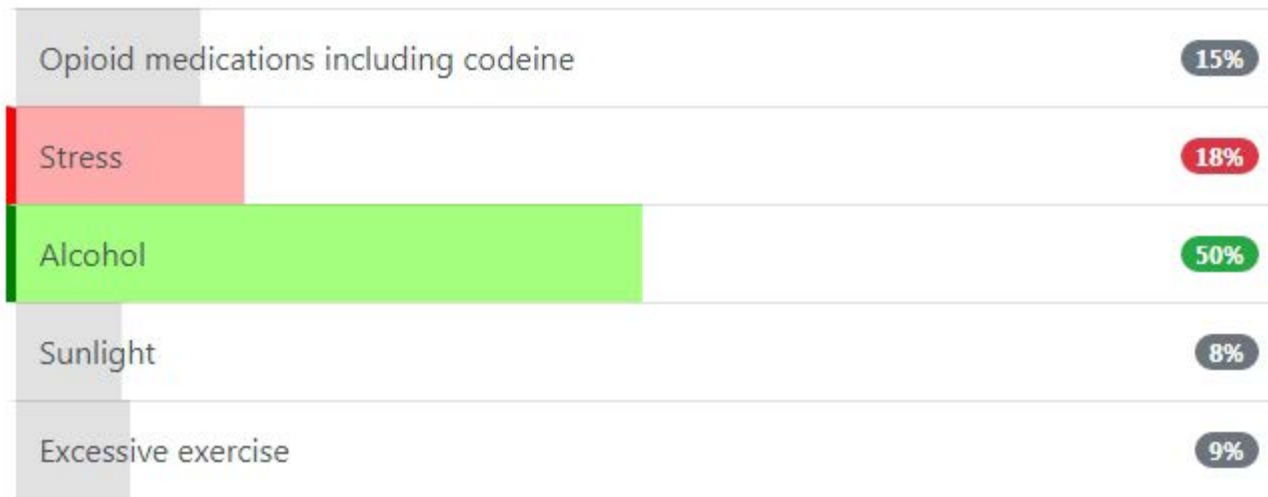
One of our registered users sent the following mnemonic to us:

- NF1: chromosome 17 - as neurofibromatosis has 17 characters
- NF2: chromosome 22 - all the 2's

A 20-year-old man presents with recent episodes of severe, stabbing pain in the right eye. These episodes typically occur once a day and last around 30 minutes. His wife reports him pacing around and shouting with the pain. She also reports that his right eye appears red and that he has clear nasal discharge during the episodes.

Given the likely diagnosis, which one of the following should you advise the patient to avoid to help prevent further episodes?

- ☐ Opioid medications including codeine
- ☐ Stress
- ☐ Alcohol
- ☐ Sunlight
- ☐ Excessive exercise



Alcohol is a common trigger for cluster headaches

Important for me Less important

This is a typical history of cluster headaches, including the age and gender of the patient.

A 63-year-old man is prescribed ropinirole for Parkinson's disease. What is the mechanism of action?

- ☐ MAO-B inhibitor
- ☐ Antimuscarinic
- ☐ Dopamine receptor agonist
- ☐ Dopamine receptor antagonist
- ☐ Decarboxylase inhibitor

MAO-B inhibitor

13%

Antimuscarinic

6%

Dopamine receptor agonist

69%

Dopamine receptor antagonist

8%

Decarboxylase inhibitor

5%

Ropinirole - dopamine receptor agonist

Important for me Less important

Which of the following is least associated with Parkinsonism?

- ☐ Chlorpromazine
- ☐ Progressive supranuclear palsy
- ☐ Dementia pugilistica
- ☐ Lead poisoning
- ☐ Wilson's disease

Chlorpromazine

12%

Progressive supranuclear palsy

8%

Dementia pugilistica

22%

Lead poisoning

35%

Wilson's disease

23%

A 61-year-old man with a chronic cough and gradual weight loss presents to the clinic with gradually worsening proximal myopathy over the past few weeks. A hilar mass has been identified on chest x-ray and he is awaiting referral to the respiratory oncology clinic. Neurological testing confirms weakness which is improved by reinforcement and movement repetition.

Which of the following autoantibodies is most likely to be found?

☐ Anti-AChR

☐ Anti-Hu

☐ Anti-Ri

☐ Anti-Yo

☐ Anti-VGCC



The most likely diagnosis is Lambert-Eaton syndrome, related to antibodies directed against voltage-gated calcium channels, resulting in proximal myopathy. A key difference from myasthenia gravis is that muscle power increases with reinforcement. There is a strong association with underlying bronchial carcinoma and symptoms often improve when the underlying tumour is treated.

Anti-AChR antibodies are associated with the development of myasthenia gravis. Anti-Hu antibodies are associated with paraneoplastic encephalomyelitis, also associated with bronchial carcinoma. Anti-Ri antibodies are associated with ocular opsoclonus. Anti-Yo antibodies are associated with paraneoplastic cerebellar degeneration.

A 20-year-old male patient presents to the GP surgery with a 2-year history of upper back pain, shoulder and arm weakness. On inspection, you notice that he has an asymmetric smile. On further examination, there is marked weakness and wasting of the right facial muscles, right trapezius, deltoid and biceps muscles. There is also winging of the right scapula. There is some weakness and wasting of the same muscle groups on the left side but to a much lesser extent. A type of muscular dystrophy is suspected.

What is the inheritance pattern of this condition?

- ☐ Autosomal dominant
- ☐ Autosomal recessive
- ☐ X-linked recessive
- ☐ X-linked dominant
- ☐ Idiopathic

Autosomal dominant

39%

Autosomal recessive

18%

X-linked recessive

24%

X-linked dominant

12%

Idiopathic

6%

Facioscapulohumeral muscular dystrophy is an autosomal dominant disorder

Important for me Less important

This patient presents with the classic appearance of facioscapulohumeral muscular dystrophy, which is an autosomal dominant disorder. There is typically an asymmetric pattern.

The other inheritance patterns are not applicable to this condition.

This condition is not idiopathic.

A 54 year-old woman presents with severe headache after a collapse while at a wedding reception. She had been dancing when she abruptly fell to the ground. On examination she is neurologically intact, but clearly finds it difficult to concentrate and is in some discomfort due to her headache. She is afebrile and denies chest pain. She reports that she had about 3 glasses of wine tonight and she normally drinks 10-12 units weekly. Her husband reports that she was unconscious for about one minute and was drowsy and confused on waking.

ECG Normal sinus rhythm

What is the most appropriate management from the options below?

- ☐ Urgent CT brain
- ☐ Referral to first-fit clinic
- ☐ Intravenous ceftriaxone and aciclovir
- ☐ Referral for outpatient ambulatory ECG monitoring
- ☐ Discharge with alcohol cessation advice

Urgent CT brain

78%

Referral to first-fit clinic

8%

Intravenous ceftriaxone and aciclovir

2%

Referral for outpatient ambulatory ECG monitoring

4%

Discharge with alcohol cessation advice

8%

This patient has collapsed in the community with onset of severe headache. Although seizure and cardiogenic syncope enter the differential, it is vital to exclude subarachnoid haemorrhage as a cause. Referral for first-fit clinic or outpatient ECG monitoring risk discharging a patient with an intracerebral bleed and are inappropriate. The normal ECG and absence of chest pain also make a cardiogenic cause less likely. Discharging the patient with alcohol cessation advice in the context of a safe level of alcohol consumption is also incorrect.

IV ceftriaxone and aciclovir would be treatment for meningitis/encephalitis. This is an important differential in severe headache but does not typically cause a collapse with sudden-onset headache.

A 78-year-old man is referred to neurology outpatients. For the past six months he has been troubled with memory impairment, hallucinations and a resting tremor. On walking into the clinic room he is noted to have a festinating gait and an expressionless face. He scores 12 / 30 on the mini-mental state examination (MMSE). Given the likely diagnosis, which one of the following tests is most likely to confirm the diagnosis?

- ☐ Serum copper levels
- ☐ Cerebral angiography
- ☐ MRI head
- ☐ SPECT scan
- ☐ PET scan

Serum copper levels

5%

Cerebral angiography

5%

MRI head

30%

SPECT scan

56%

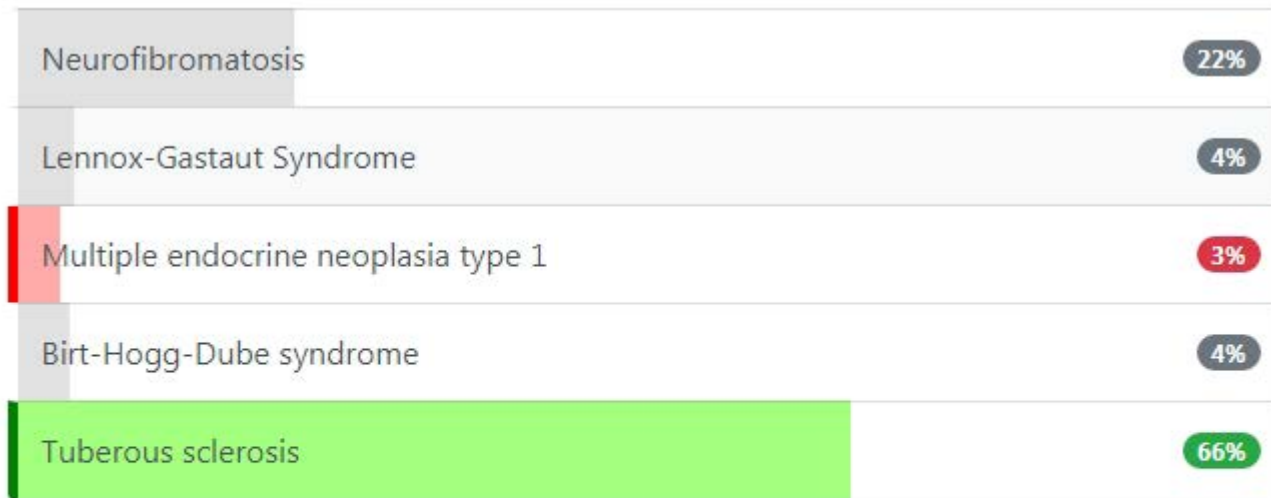
PET scan

4%

This patient has Lewy body dementia. The findings on conventional imaging such as MRI are generally non-specific.

A 19-year-old man is admitted following a generalised seizure. No past history is available as the man is currently in a postictal state. On examination it is noted that he has three patches of hypopigmented skin and fibromata under two of his finger nails. What is the most likely diagnosis?

- ☐ Neurofibromatosis
- ☐ Lennox-Gastaut Syndrome
- ☐ Multiple endocrine neoplasia type 1
- ☐ Birt-Hogg-Dube syndrome
- ☐ Tuberous sclerosis



This man has a neurocutaneous syndrome which raises the possibility of neurofibromatosis or tuberous sclerosis. Given the areas of hypopigmentation and subungual fibromas the most likely diagnosis is tuberous sclerosis

A 29-year-old female presents complaining of double vision and unsteadiness. She has no past medical history of note. On examination she has limited movement of her eyes in all directions. Pupils are 3 mm, equal and reactive to light. Examination of the peripheral nervous system is normal other than reduced reflexes and the plantars are down going. Some past-pointing is also noted. What is the most likely diagnosis?

- ☐ Multiple sclerosis
- ☐ Conversion disorder
- ☐ Miller Fisher syndrome
- ☐ Ataxic telangiectasia
- ☐ Friedreich's ataxia

Multiple sclerosis

17%

Conversion disorder

7%

Miller Fisher syndrome

52%

Ataxic telangiectasia

9%

Friedreich's ataxia

16%

Miller Fisher syndrome - areflexia, ataxia, ophthalmoplegia

Important for me Less Important

This patient has Miller Fisher syndrome, a variant of Guillain-Barre syndrome

A 39-year-old female who presents with a 3-month history of acute attacks of loss of vision and weakness in the lower limbs is diagnosed with neuromyelitis optica. When making a diagnosis of neuromyelitis optica, which of the following is a possible distinguishing feature from multiple sclerosis?

- ☐ Memory loss
- ☐ Optic neuritis
- ☐ Acute myelitis
- ☐ NMO-IgG seropositive
- ☐ Brain CT not meeting criteria for Multiple sclerosis at disease onset

Memory loss	16%
Optic neuritis	10%
Acute myelitis	11%
NMO-IgG seropositive	48%
Brain CT not meeting criteria for Multiple sclerosis at disease onset	15%

Multiple sclerosis (MS) can present with memory loss, optic neuritis, acute myelitis but is not NMO-IgG seropositive. Brain MRI not meeting criteria for Multiple sclerosis at disease onset is a distinguishing factor from neuromyelitis optica but not Brain CT.

Neuromyelitis optica which is also known as Devic's disease is an autoimmune disorder in which immune system cells and antibodies attack the optic nerves and the spinal cord. The pathophysiology is still however completely unclear. The diagnosis of neuromyelitis optica is determined as follows:

Absolute criteria:

- Optic neuritis
- Acute myelitis

Supportive criteria:

- Brain MRI not meeting criteria for MS at disease onset
- Spinal cord MRI with contiguous T2-weighted signal abnormality extending over three or more vertebral segments
- NMO-IgG seropositive status (The NMO-IgG test checks the existence of antibodies against the aquaporin 4 antigen.)

Compared to multiple sclerosis, the acute episodes are not understood to be triggered by the immune system's T cells, but rather by antibodies called NMO-IgG.

A 63-year-old man is prescribed selegiline for Parkinson's disease. What is the mechanism of action?

- ☐ Dopamine receptor antagonist
- ☐ Dopamine receptor agonist
- ☐ Monoamine Oxidase-B inhibitor
- ☐ Antimuscarinic
- ☐ Catechol-O-Methyl Transferase inhibitor

Dopamine receptor antagonist

5%

Dopamine receptor agonist

12%

Monoamine Oxidase-B inhibitor

64%

Antimuscarinic

6%

Catechol-O-Methyl Transferase inhibitor

13%

Selegiline - MAO-B inhibitor

Important for me Less important

A 34-year-old male rugby player presents to the GP surgery with a 5-day history of sudden onset severe pain in the right shoulder and upper arm, which has now subsided but followed by a 1-day history of weakness in the shoulder. On examination, there is reduced power in the deltoid muscle. There is a full range of passive movement of the shoulder joint. The rest of the neurological examination is normal.

What is the most likely diagnosis?

- ☐ Shoulder joint dislocation
- ☐ Osteoarthritis
- ☐ Adhesive capsulitis
- ☐ Brachial neuritis
- ☐ Cervical artery dissection

Shoulder joint dislocation	11%
Osteoarthritis	2%
Adhesive capsulitis	21%
Brachial neuritis	56%
Cervical artery dissection	10%

Brachial neuritis is characterized by acute onset unilateral severe pain followed by shoulder and scapular weakness several days later

Important for me Less important

Brachial neuritis is characterized by acute onset of unilateral severe pain followed by shoulder and scapular weakness several days later.

The clinical information rules out dislocation.

The patient is too young to have significant osteoarthritis and the presentation is too acute to be osteoarthritis. Osteoarthritis would also present with joint pain on passive movement which is not the case here.

Cervical artery dissection is a cause of stroke. It would present with upper motor neurone signs and pain is not such a prominent component.

Each one of the following is associated with Friedreich's ataxia, except:

- ☐ Increased risk of deep vein thrombosis
- ☐ Optic atrophy
- ☐ Cardiomyopathy
- ☐ Nystagmus
- ☐ High-arched palate

Increased risk of deep vein thrombosis

45%

Optic atrophy

12%

Cardiomyopathy

9%

Nystagmus

10%

High-arched palate

25%

A 39-year-old lady admitted complaining of severe headache and floppy limbs. She says she has some blurry vision

She is well known to the cardiology firm due to her post partum cardiomyopathy Previous investigations for blurry vision were inconclusive with no particular diagnosis reached.

On examination she has 5/5 power and sensation but tires easily. There is an upgoing left plantar. The patient has a body mass index of 41 kg/m^2 . Her ECG shows normal sinus rhythm.

Results from a lumbar puncture are as follows:

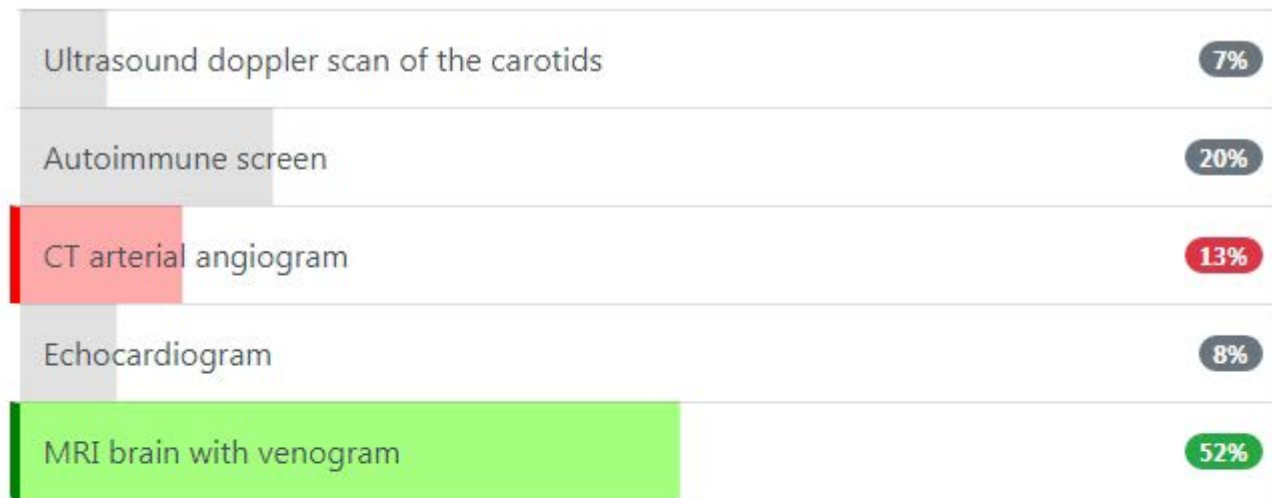
White Cells	2 cells/L
Red Cells	3 cells/L
Glucose	75% of plasma level
Xanthochromia	negative
Opening pressure	36 cm H ₂ O

The on call radiologist has authorised this report:

CT Head	No acute intracranial bleed. Skull base intact. Chronic changes to right hemisphere
---------	---

Which is the next most appropriate investigation?

- ☐ Ultrasound doppler scan of the carotids
- ☐ Autoimmune screen
- ☐ CT arterial angiogram
- ☐ Echocardiogram
- ☐ MRI brain with venogram



There are features suggestive of idiopathic intracranial hypertension (e.g., raised opening pressure. However, the upgoing plantar and curious CT head report must make you suspicious of a cerebrovascular event, such as an infarction or even an intracranial sinus thrombosis. In this situation MRI imaging of the head would be the best test to rule out these differentials. Remember that a CT head is not perfectly sensitive for acute ischaemia, and its use in the acute scenario is to rule out a haemorrhagic stroke

The other tests may be useful later when once the primary pathology (in this case, an acute stroke) has been established. CT angiography would only be of use if you suspected a carotid or vertebral dissection - there is little in the history to support this.

Which one of the following drugs is used in the management of multiple sclerosis?

☐ Beta-interferon

☐ Gamma-interferon

☐ Infliximab

☐ Rituximab

☐ Alpha-interferon

Beta-interferon

56%

Gamma-interferon

14%

Infliximab

8%

Rituximab

7%

Alpha-interferon

16%

A 23-year-old man presents with a 4 day history of an itchy and sore right ear. He has recently returned from holiday in Spain. On examination the right ear canal is inflamed but no debris is seen. The tympanic membrane is clearly visible and is unremarkable. What is the most appropriate management?

- ☐ Topical corticosteroid + aminoglycoside
- ☐ Topical corticosteroid
- ☐ Refer to ENT
- ☐ Topical corticosteroid + clotrimazole
- ☐ Oral flucloxacillin

Topical corticosteroid + aminoglycoside	38%
Topical corticosteroid	18%
Refer to ENT	10%
Topical corticosteroid + clotrimazole	17%
Oral flucloxacillin	17%

This patient has otitis externa, which commonly develops after swimming on holiday. The first line management is either a topical antibiotic or a combined topical antibiotic and steroid.

Which one of the following conditions is least recognised as a cause of a seventh nerve palsy?

- ☐ Acoustic neuroma
- ☐ Herpes zoster
- ☐ HIV
- ☐ Systemic lupus erythematosus
- ☐ Diabetes mellitus



A 49-year-old man presents to the Emergency Department complaining of visual disturbance. Examination reveals a right incongruous homonymous hemianopia. Where is the lesion most likely to be?

- ☐ Left optic tract
- ☐ Left optic radiation
- ☐ Right optic tract
- ☐ Right optic radiation
- ☐ Optic chiasm

A 49-year-old man presents to the Emergency Department complaining of visual disturbance. Examination reveals a right incongruous homonymous hemianopia. Where is the lesion most likely to be?

Left optic tract

51%

Left optic radiation

24%

Right optic tract

12%

Right optic radiation

8%

Optic chiasm

5%

An 18-year-old male gives a history of early morning jerking movements of his arm. After a night of heavy drinking and sleep deprivation, he has a generalised tonic-clonic seizure at 5am. An EEG reveals generalised spike and wave discharges. What is the most appropriate choice of anti-epileptic?

- ☐ Carbamazepine
- ☐ Ethosuximide
- ☐ Sodium valproate
- ☐ Gabapentin
- ☐ Phenytoin

Carbamazepine

12%

Ethosuximide

5%

Sodium valproate

77%

Gabapentin

2%

Phenytoin

4%

Juvenile myoclonic epilepsy (the diagnosis here), is a common form of idiopathic generalised epilepsy, representing 10% of all patients with epilepsy. This disorder typically first manifests itself between the ages of 10 and 18 with brief episodes of involuntary muscle twitching occurring early in the morning. Most patients also have generalised seizures that affect the entire brain and others have absence seizures. The most effective medication for this disorder is sodium valproate.

Which one of the following antibodies are associated with painful sensory neuropathy in patients with small cell lung cancer?

☐ Anti-Ri

☐ Anti-GAD

☐ Anti-Ro

☐ Anti-Hu

☐ Anti-Yo

Anti-Ri

11%

Anti-GAD

16%

Anti-Ro

14%

Anti-Hu

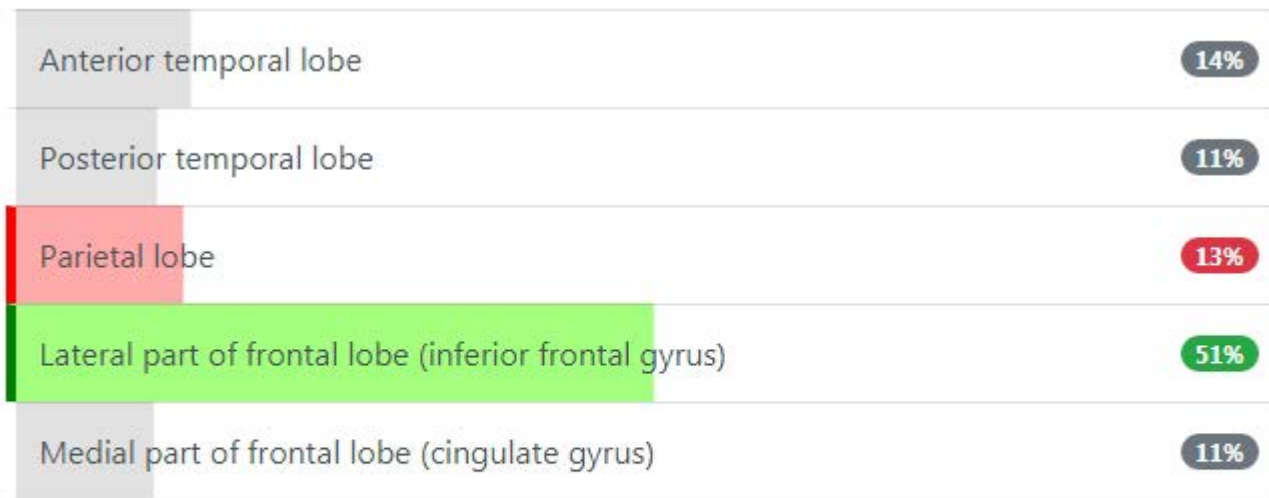
50%

Anti-Yo

10%

A 52-year-old man is reviewed in the neurology clinic. He has been referred due to the development of difficulty in finding the right words whilst speaking. His comprehension of normal conversation has however remained normal. Where is the likely lesion?

- ☐ Anterior temporal lobe
- ☐ Posterior temporal lobe
- ☐ Parietal lobe
- ☐ Lateral part of frontal lobe (inferior frontal gyrus)
- ☐ Medial part of frontal lobe (cingulate gyrus)



This man has expressive aphasia due to a lesion in Broca's area, located on the posterior aspect of the frontal lobe, in the inferior frontal gyrus

A 45-year-old female is diagnosed with a glioma in the parietal lobe after being investigated for new onset seizures. Which one of the following features is she most likely to develop?

- ☐ Visual agnosia
- ☐ Auditory agnosia
- ☐ Acalculia
- ☐ Inability to generate a list
- ☐ Expressive (Broca's) aphasia

Visual agnosia

7%

Auditory agnosia

12%

Acalculia

62%

Inability to generate a list

8%

Expressive (Broca's) aphasia

11%

Parietal lobe lesions may cause acalculia

Important for me Less important

A 44-year-old man was admitted to the medical unit with vomiting, drowsiness and headache. On examination he was febrile, squinting to bright lights and had severe pain when extending his knee when his hip was lifted off the bed. He was started on IV cefotaxime and IV dexamethasone and underwent a lumbar puncture.

What is the most common long-term complication of this condition?

- ☐ Encephalitis
- ☐ Hydrocephalus
- ☐ Sensorineural hearing loss
- ☐ Seizures
- ☐ Cerebral abscess

Encephalitis

11%

Hydrocephalus

9%

Sensorineural hearing loss

50%

Seizures

19%

Cerebral abscess

10%

Sensorineural hearing loss is the most common complication following meningitis

Important for me Less important

The correct answer is sensorineural hearing loss.

A 61 year-old man presents to the respiratory clinic with a 2-month history of progressive weakness and shortness of breath. He finds it difficult to stand from sitting, and struggles climbing stairs. He is an ex-smoker with chronic obstructive pulmonary disease (COPD). He had a recent exacerbation one month ago for which he was treated by the GP with a course of oral prednisolone, during which time his weakness transiently improved. On examination you note a left-sided monophonic wheeze and reduced breath sounds at the left lung base. Blood tests and a chest x-ray are requested.

Hb	145 g/L
WCC	10.9 10 ⁹ /l
Na ⁺	138 mmol/L
K ⁺	4.3 mmol/L
Urea	6.8 mmol/L
Creatinine	93 mmol/L
Calcium	2.62 mmol/L
Phosphate	1.44 mmol/L

Chest x-ray	Hyperexpanded lungs, left lower lobe collapse, bulky left hilum
-------------	---

What is the most likely cause of this patient's weakness?

- ☐ Myasthenia gravis
- ☐ Steroid-induced myopathy
- ☐ Lambert-Eaton myasthenic syndrome
- ☐ Hypercalcaemia
- ☐ Motor neurone disease

Myasthenia gravis	10%
Steroid-induced myopathy	7%
Lambert-Eaton myasthenic syndrome	74%
Hypercalcaemia	4%
Motor neurone disease	5%

This man has a small-cell lung cancer (SCLC) and associated Lambert-Eaton myasthenic syndrome - a well-recognised paraneoplastic manifestation of SCLC. This classically effects the proximal muscles, especially in the legs, causing difficulty in standing from a seated position and climbing stairs. In contrast to myasthenia gravis, eye involvement is uncommon. Treatment with steroids is often helpful, which explains his transient symptomatic improvement during treatment for his COPD exacerbation.

Steroid myopathy does not fit as the symptoms started well before his course of prednisolone. Although the patient is mildly hypercalcaemic this would not be sufficient to produce his presenting symptoms, although it does reinforce the suspicion of lung malignancy. Motor neurone disease would be unlikely in this context and would not improve with steroids. Myasthenia gravis could produce these symptoms, but in the context of a new lung mass is a less viable diagnosis.

A 41-year-old man presents with a two week history of headaches around the left side of his face associated with watery eyes. He describes having about two episodes a day each lasting around 30 minutes. On examination he has a red left eye and a partial left ptosis. There is no past medical history of note other than migraines as a child. What is the likely diagnosis?

- ☐ Atypical migraine
- ☐ Cluster headache
- ☐ Trigeminal neuralgia
- ☐ Acute angle closure glaucoma
- ☐ Cavernous sinus thrombosis

Atypical migraine

6%

Cluster headache

80%

Trigeminal neuralgia

6%

Acute angle closure glaucoma

3%

Cavernous sinus thrombosis

5%

Episodic eye pain, lacrimation, nasal stuffiness occurring daily - cluster headache

Important for me Less important

A 33-year-old motorcyclist was brought into the emergency department by ambulance following a traffic accident. On presentation, he was haemodynamically stable. Neurological examination revealed a paralysis of all intrinsic muscles of the right hand. There is also a loss of sensation in the medial aspect of the right hand and forearm.

What is the likely diagnosis?

- ☐ Klumpke's paralysis
- ☐ Median nerve damage
- ☐ Carpal tunnel syndrome
- ☐ Erb's palsy
- ☐ Acute intracranial haemorrhage

Klumpke's paralysis

43%

Median nerve damage

26%

Carpal tunnel syndrome

6%

Erb's palsy

22%

Acute intracranial haemorrhage

4%

Klumpke's paralysis: T1 nerve root damage

Important for me [Less important](#)

This patient has paralysis of all intrinsic hand muscles which points towards C8-T1 nerve root damage i.e. Klumpke's paralysis.

Median nerve damage usually leads to weakness of the thenar muscles.

Carpal tunnel syndrome usually causes median nerve pathology and does not affect the other intrinsic hand muscles.

Erb's palsy is damage to the C5-6 nerve root. It usually presents with loss of sensation in the arm and paralysis of the deltoid, biceps, and brachialis muscles

Dr. Arsem

In the treatment of migraine, sumatriptan is an example of a:

- ☐ Beta-blocker
- ☐ Alpha-blocker and a partial 5-HT₂ agonist
- ☐ Specific 5-HT₁ agonist
- ☐ 5-HT₂ antagonist
- ☐ Tricyclic antidepressant

Beta-blocker

2%

Alpha-blocker and a partial 5-HT₂ agonist

5%

Specific 5-HT₁ agonist

66%

5-HT₂ antagonist

23%

Tricyclic antidepressant

4%

Migraine

- acute: triptan + NSAID or triptan + paracetamol
- prophylaxis: topiramate or propranolol

Important for me Less important

You are working on the neurology ward. A 32-year-old woman with two young children has just been diagnosed with a chronic neurological disease after presenting with acute double vision. Two years ago she had an episode of acute vertigo which she put down to labyrinthitis. She has had an MRI scan of her brain and spine. She wants to know what sort of disease course she should expect. Which of the following patterns is most likely for the first several years of the disease?

- ☐ Symptoms affecting peripheral nervous system first, and central nervous system later
- ☐ Occasional flares of new symptoms in different areas of the body with variable recovery in between
- ☐ A slow and gradual accumulation of symptoms over the next 20 years
- ☐ Symptoms gradually ascending up her body starting with foot drop
- ☐ Rapid accumulation of new symptoms initially but slowing after around 10 years

Symptoms affecting peripheral nervous system first, and central nervous system later

7%

Occasional flares of new symptoms in different areas of the body with variable recovery in between

73%

A slow and gradual accumulation of symptoms over the next 20 years

10%

Symptoms gradually ascending up her body starting with foot drop

4%

Rapid accumulation of new symptoms initially but slowing after around 10 years

6%

The most common pattern for progression of multiple sclerosis is relapsing-remitting

Important for me Less important

The correct answer is 2. This woman is likely to have multiple sclerosis (MS). She has distinct lesions in different areas of her brain and spine, which have developed at different times.

There are four disease patterns in MS (clinically isolated syndrome, relapsing-remitting MS, primary progressive MS, and secondary progressive MS). The most likely disease course is relapsing and remitting - the occasional onset of new symptoms with complete or partial recovery in between episodes and the gradual accumulation of disability.

NICE: multiple sclerosis

<https://www.nice.org.uk/guidance/CG186/chapter/1-Recommendations#providing-information-and-support>

Dr Assem

A 31-year-old man attends his appointment with an oncologist after being referred by his family physician. The man reported feeling nauseous and having a persistent headache for the past month. The pain was not relieved by the regular over-the-counter painkiller. The patient confirms that he has a significant family history of cancer and this is why he has been referred to see the oncologist.

After chromosome analysis which revealed an abnormality related to the chromosome 3p, the patient is explained that his condition will put him at higher risk of developing several tumors, which could be both benign and malignant. The oncologist tells the patient that this condition can be passed on to future generations and that the patient's children have a fifty-percent chance of developing the condition, given his spouse does not carry the mutation as well. The patient is happy to know that he will not need a screening flexible sigmoidoscopy.

Which of the following diseases is the patient at the highest risk of developing due to his underlying condition?

- ☐ Lung carcinoma
- ☐ Clear-cell renal carcinoma
- ☐ Prostate carcinoma
- ☐ Breast carcinoma
- ☐ Osteogenic sarcoma

Lung carcinoma	15%
Clear-cell renal carcinoma	47%
Prostate carcinoma	9%
Breast carcinoma	9%
Osteogenic sarcoma	21%

Von Hippel-Lindau syndrome is associated with the development of clear-cell renal cell carcinoma

Important for me Less important

This patient presented with a persistent headache and feeling nauseous, in the setting of a positive family history of cancer. This has prompted the family physician to make a referral to an oncologist for further investigations. An abnormality related to the chromosome 3p, which carries the VHL gene, indicates that this man might be suffering from Von Hippel-Lindau (VHL) syndrome. This is an autosomal dominant condition which increases the risk of developing several cancers. Clear-cell renal carcinoma is one of the tumors which patient with VHL syndrome are at an increased risk of suffering from, although the most common tumors are hemangiomas. None of the other cancers mentioned below are associated with VHL although they may occur in a person with VHL. (First Aid 2017, p495).

1: Lung carcinoma is one of the major causes of death worldwide. The disease is mainly due to smoking but can also occur in non-smokers due to environmental pollutants. Symptoms include persistent cough, hemoptysis, and loss of weight. Chest X-ray is an important first-line investigation in patients suspected of having lung cancer.

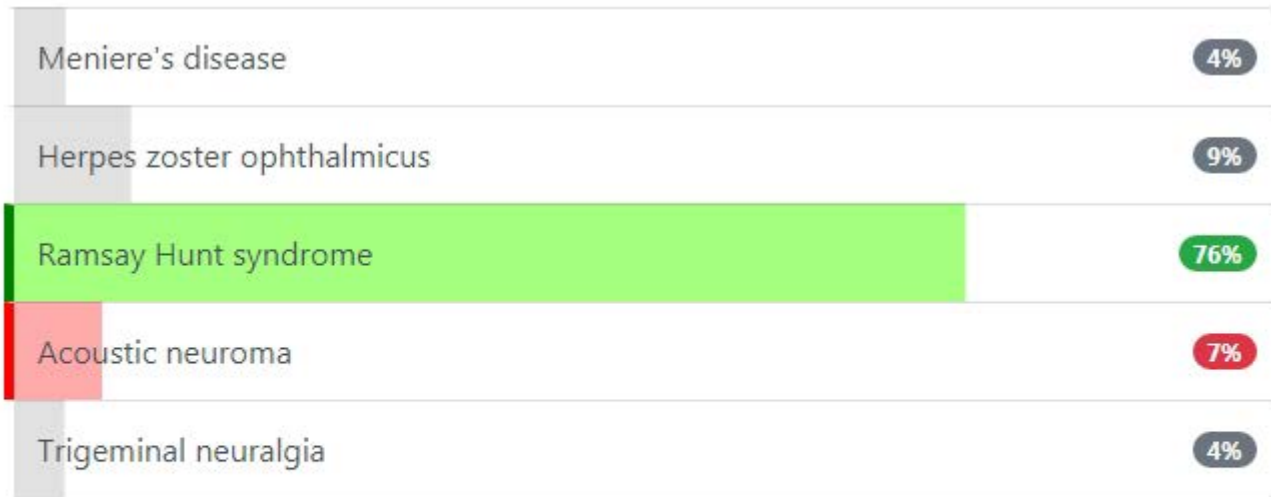
3: Prostate carcinoma is one of the most common cancers in men. Patients usually present with lower urinary tract symptoms such as frequency, poor flow or nocturia amongst others. While these symptoms are often due to benign prostatic hypertrophy, it is important to investigate these patients to rule out a prostate malignancy.

4: Breast carcinoma is one of the most common cancers in women. It can be non-invasive or invasive. Invasive ductal carcinoma is the most common of all breast cancers. Treatment range from wide-margin excision to mastectomy, and may also include radiotherapy and chemotherapy.

5: Osteogenic sarcoma, also known as osteosarcoma, is one of the most prevalent bone tumors of malignant origin. The disease usually occurs into those under 20 years and above 65 years of age. Anatomically, it develops in the metaphyses of the long bones, typically around the knee. A characteristic X-ray appearance is that of the Codman triangle.

A 59-year-old man presents with a severe pain deep within his right ear. He feels dizzy and reports that the room 'is spinning'. Clinical examination shows a partial facial nerve palsy on the right side and vesicular lesions on the anterior two-thirds of his tongue. What is the most likely diagnosis?

- ☐ Meniere's disease
- ☐ Herpes zoster ophthalmicus
- ☐ Ramsay Hunt syndrome
- ☐ Acoustic neuroma
- ☐ Trigeminal neuralgia



Whilst vesicular lesions are more classically seen in the external auditory canal and pinna they may also be seen on the anterior 2/3rds of the tongue and the soft palate.

Dr Assem

Which one of the following statements regarding the stopping of anti-epileptic drugs (AED) is most correct?

- ☐ Can be considered if seizure free for > 5 years, with AEDs being stopped over 2-3 months
- ☐ Can be considered if seizure free for > 2 years, with AEDs being stopped over 2-3 months
- ☐ Can be considered if seizure free for > 1 year, with AEDs being stopped over 2-3 months
- ☐ Can be considered if seizure free for > 5 years, with AEDs being stopped over 8-12 months
- ☐ Can be considered if seizure free for > 1 year, with AEDs being stopped over 8-12 months

Can be considered if seizure free for > 5 years, with AEDs being stopped over 2-3 months

14%

Can be considered if seizure free for > 2 years, with AEDs being stopped over 2-3 months

44%

Can be considered if seizure free for > 1 year, with AEDs being stopped over 2-3 months

15%

Can be considered if seizure free for > 5 years, with AEDs being stopped over 8-12 months

19%

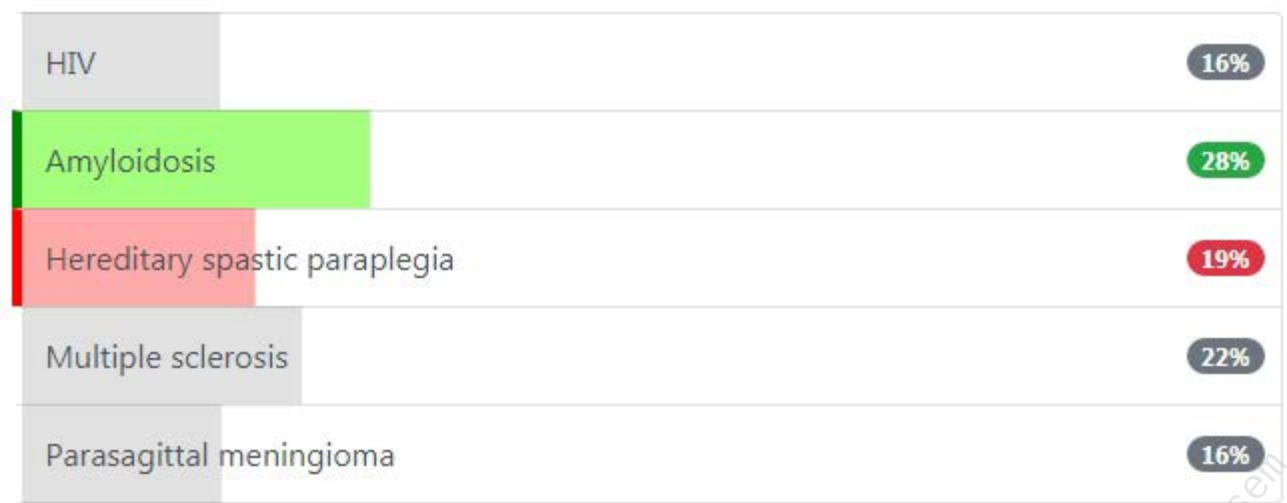
Can be considered if seizure free for > 1 year, with AEDs being stopped over 8-12 months

9%

The above reflects 2004 NICE guidelines and should be done under the guidance of a specialist. Benzodiazepines should be withdrawn over a longer period.

A 54-year-old man presents concerned about leg weakness. On examination he is noted to have increased tone in both legs, brisk reflexes and weakness in both lower limbs. Examination of his upper limbs is normal. Which one of the following is least likely to produce these symptoms?

- ☐ HIV
- ☐ Amyloidosis
- ☐ Hereditary spastic paraplegia
- ☐ Multiple sclerosis
- ☐ Parasagittal meningioma



Amyloidosis is the least likely of the above options to result in a spastic paraparesis

Each of the following features are seen in myotonic dystrophy, except:

- ☐ Mild mental impairment
- ☐ Round face
- ☐ Frontal balding
- ☐ Myotonia
- ☐ Cataracts

Mild mental impairment

14%

Round face

59%

Frontal balding

9%

Myotonia

5%

Cataracts

13%

Dystrophia myotonica - DM1

- distal weakness initially
- autosomal dominant
- diabetes
- dysarthria

Important for me Less important

A 29-year-old man with myotonic dystrophy has an electrocardiogram. Which one of the following findings is most likely to be present?

- ☐ Wide QRS complex
- ☐ Atrial fibrillation
- ☐ Voltage criteria for left ventricular hypertrophy
- ☐ Right axis deviation
- ☐ Prolonged PR interval

Wide QRS complex

13%

Atrial fibrillation

6%

Voltage criteria for left ventricular hypertrophy

26%

Right axis deviation

10%

Prolonged PR interval

45%

A prolonged PR interval is seen in around 20-40% of patients

A 40-year-old woman presents with recurrent episode of vertigo associated with a feeling or 'fullness' and 'pressure' in her ears. She thinks her hearing is worse during the attacks. Clinical examination is unremarkable. What is the most likely diagnosis?

- ☐ Meniere's disease
- ☐ Benign paroxysmal positional vertigo
- ☐ Acoustic neuroma
- ☐ Cholesteatoma
- ☐ Somatisation

Meniere's disease

76%

Benign paroxysmal positional vertigo

9%

Acoustic neuroma

7%

Cholesteatoma

5%

Somatisation

3%

Dr Assem

A 63-year-old man who is known to have small cell lung carcinoma presents with gradually worsening muscle weakness. This initially affected his legs but is now spreading to the arms. He also complains of a dry mouth and erectile dysfunction. Neurological examination show bilateral leg and arm weakness associated with hyporeflexia. Antibodies to which one of the following are most likely to be responsible for these findings?

- ☐ RNA-binding protein Nova-1
- ☐ NMDA-receptors
- ☐ Muscarinic acetylcholine receptors
- ☐ Nicotinic acetylcholine receptors
- ☐ Voltage gated calcium channels

RNA-binding protein Nova-1

3%

NMDA-receptors

7%

Muscarinic acetylcholine receptors

14%

Nicotinic acetylcholine receptors

7%

Voltage gated calcium channels

68%

A 35-year-old man with a history of schizophrenia is brought to the Emergency Department by worried friends due to drowsiness. On examination he is generally rigid. A diagnosis of neuroleptic malignant syndrome is suspected. Each one of the following is a feature of neuroleptic malignant syndrome, except:

- ☐ Renal failure
- ☐ Pyrexia
- ☐ Elevated creatine kinase
- ☐ Usually occurs after prolonged treatment
- ☐ Tachycardia

Renal failure	17%
Pyrexia	3%
Elevated creatine kinase	5%
Usually occurs after prolonged treatment	70%
Tachycardia	6%

Neuroleptic malignant syndrome is typically seen in patients who have just commenced treatment. Renal failure may occur secondary to rhabdomyolysis

A 51-year-old man with a history of schizophrenia is reviewed. He has developed parkinsonism secondary to his antipsychotic medication. Which one of the following drugs is most useful in the management of tremor?

☐ Apomorphine

☐ Cabergoline

☐ Selegiline

☐ Amantadine

☐ Benzhexol



Benzhexol is now more commonly referred to as trihexyphenidyl. It is now mainly used for drug-induced parkinsonism rather than idiopathic Parkinson's disease

A 57-year-old woman presents with an 8 week history of intermittent dizziness. These episodes typically occur when she suddenly moves her head and are characterised by the sensation that the room is 'spinning'. Most attacks last around one minute before dissipating. Neurological examination is unremarkable. What is the most likely diagnosis?

- ☐ Benign paroxysmal positional vertigo
- ☐ Meniere disease
- ☐ Crescendo transient ischaemic attacks
- ☐ Multiple sclerosis
- ☐ Viral labyrinthitis

Benign paroxysmal positional vertigo	80%
Meniere disease	7%
Crescendo transient ischaemic attacks	4%
Multiple sclerosis	4%
Viral labyrinthitis	5%

Viral labyrinthitis typically causes constant symptoms of a shorter duration. Patients with Meniere disease usually have associated hearing loss and tinnitus. Also, the vertigo associated with Meniere disease typically lasts much longer.

A 45-year-old male with a history of alcoholic liver disease presents with increasing confusion. On assessment, he is noted to be obtunded with a Glasgow coma scale of 14 out of 15, has a wide-based gait and nystagmus. There is no history or signs of recent trauma.

What is the most specific finding on brain MRI for this patient's condition?

- ☐ Left-sided subdural haematoma
- ☐ Generalised cerebral atrophy
- ☐ Hydrocephalus
- ☐ Enhancement of the mamillary bodies
- ☐ Right-sided cerebellar infarction

Left-sided subdural haematoma	9%
Generalised cerebral atrophy	15%
Hydrocephalus	8%
Enhancement of the mamillary bodies	51%
Right-sided cerebellar infarction	18%

This patient is suffering from Wernicke's encephalopathy as indicated by the history of alcoholic liver disease with confusion, ataxia and ophthalmoplegia. The MRI finding of enhancement of the mamillary bodies due to petechial haemorrhages is specific for Wernicke's encephalopathy, although sensitivity is only 50%.

Explanation for other options:

- 1. A spontaneous subdural haematoma is a common cause of neurological deterioration in alcoholic patients but this patient's signs are more suggestive of Wernicke's rather than a localising brain lesion.
- 2. This would likely also be present but would not account for the acute presentation.
- 3. There is nothing in the history to suggest a cause of hydrocephalus.
- 5. This would cause ataxia and nystagmus but would be more likely to present with lateralizing signs and would not be associated with acute confusion.

A 44-year-old woman presents with a three month history of worsening involuntary movements of the head. These are worse when she is stressed and improved by alcohol. They are not present when she is sleep. There are no other neurological symptoms of note and neurological examination is unremarkable other than spontaneous movements of the head which are worse when she looks to either side. Her father had a similar complaint but never sought medical attention. What is the most likely diagnosis?

- ☐ Parkinson's disease
- ☐ Cerebellar tremor
- ☐ Huntington's disease
- ☐ Multiple sclerosis
- ☐ Essential tremor



Essential tremor is the most common cause of titubation (head tremor). Whilst the majority of patients will complain of hand tremor titubation may occur in isolation. The tremor is characteristic as it is worse on movement and during stress and relieved by alcohol and sleep. The family history is also a pointer.

A 5-year-old boy is diagnosed as having absence seizures. What is the chance he will be seizure free by the age of 16-years-old?

☐ 5-10%

☐ 20-25%

☐ 40-45%

☐ 65-70%

☐ 90-95%



Absence seizures - good prognosis: 90-95% become seizure free in adolescence

Important for me Less important

A 54-year-old man with small cell lung cancer complains of muscle weakness. Each one of the following are features of Lambert-Eaton syndrome, except:

- ☐ Proximal muscles more commonly affected
- ☐ Hyporeflexia
- ☐ Dry mouth
- ☐ Repeated muscle contractions lead to decreased muscle strength
- ☐ Impotence

Proximal muscles more commonly affected

7%

Hyporeflexia

6%

Dry mouth

6%

Repeated muscle contractions lead to decreased muscle strength

70%

Impotence

10%

In myasthenia gravis repeated muscle contractions lead to reduced muscle strength. The opposite is however classically seen in the related disorder Lambert-Eaton syndrome

Which one of the following is least likely to produce a lymphocytosis in the cerebrospinal fluid?

- ☐ Systemic lupus erythematosus
- ☐ Guillain-Barre syndrome
- ☐ Viral encephalitis
- ☐ Partially treated bacterial meningitis
- ☐ Behcet's syndrome

Systemic lupus erythematosus

19%

Guillain-Barre syndrome

30%

Viral encephalitis

13%

Partially treated bacterial meningitis

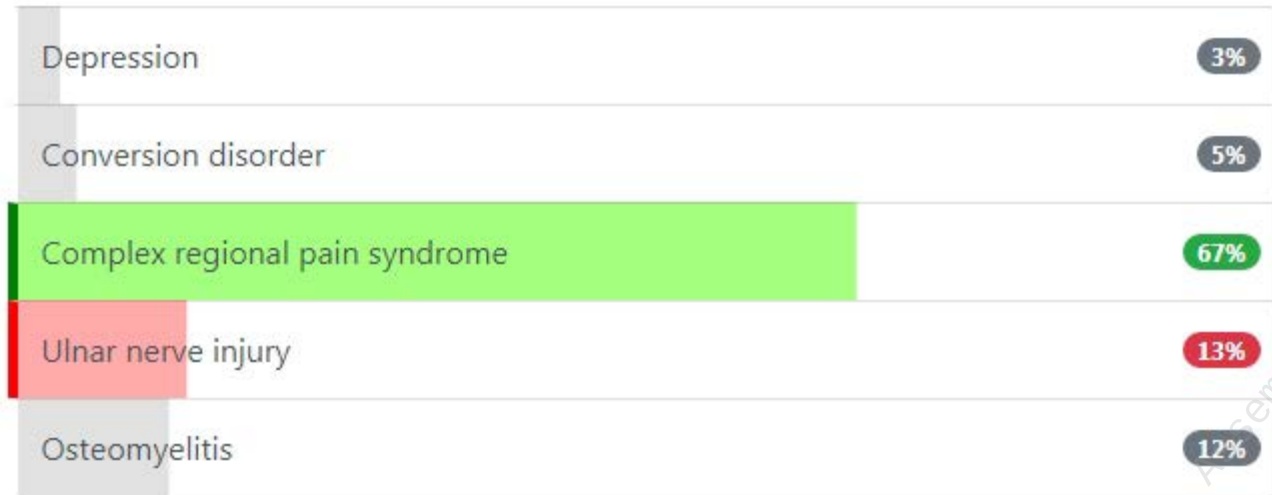
21%

Behcet's syndrome

17%

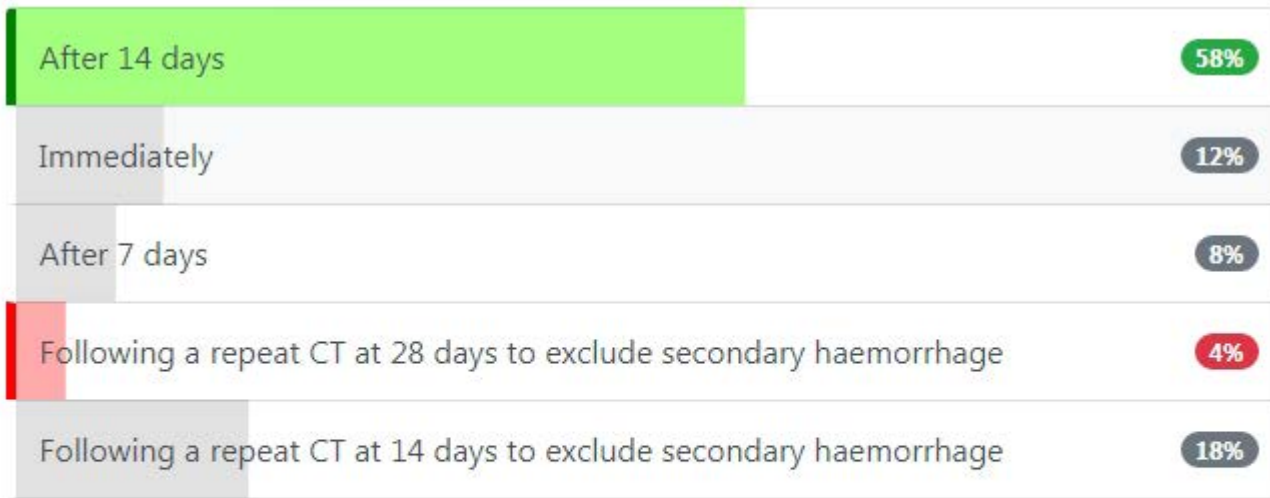
A 38-year-old woman comes for review. Six months ago she fractured her left wrist whilst skiing. The fracture was treated using a cast and repeat x-rays showed that the bone had healed well. Unfortunately for the past few weeks she has been plagued with ongoing 'shooting pains' in her left hand associated with swelling. On examination the left hand is extremely tender to even light touch. Her left hand is also slightly swollen compared to the right. What is the most likely diagnosis?

- ☐ Depression
- ☐ Conversion disorder
- ☐ Complex regional pain syndrome
- ☐ Ulnar nerve injury
- ☐ Osteomyelitis



A 65-year-old female is admitted with a right hemiparesis. Examination reveals she is in atrial fibrillation. CT confirms an ischaemic stroke and aspirin 300mg is commenced. If the patient is well and develops no new problems at what point should warfarin be started?

- ☐ After 14 days
- ☐ Immediately
- ☐ After 7 days
- ☐ Following a repeat CT at 28 days to exclude secondary haemorrhage
- ☐ Following a repeat CT at 14 days to exclude secondary haemorrhage



The 2004 RCP guidelines recommend that anticoagulation should be commenced 14 days after an ischaemic stroke. Earlier anticoagulation may exacerbate any secondary haemorrhage

A 27 year old male with polycystic kidney disease presents with sudden onset headache and collapse. On admission to emergency department his blood pressure 190/105 mmHg, tachycardic with a Glasgow Coma Score of 7/15. He is intubated and transferred for a CT scan. The scan reveals a subarachnoid haemorrhage. He is transferred to the critical care unit for monitoring. Which medication should be prescribed to reduce the chance of any acute complications?

- ☐ Labetalol
- ☐ Mannitol
- ☐ Ramipril
- ☐ Furosemide
- ☐ Nimodipine

Labetalol	18%
Mannitol	17%
Ramipril	4%
Furosemide	3%
Nimodipine	57%

Nimodipine is used to prevent vasospasm in aneurysmal subarachnoid haemorrhages

Important for me Less important

Patients presenting following sub arachnoid haemorrhage may suffer from cerebral vasospasm. Vasospasm occurs in approximately 30% of patients. In the sub population that this occurs in, it may result in further ischemia due to a reduction in distal blood flow. All patients are prescribed a calcium channel blocker to prophylactically prevent this from occurring.

In these patients we do not want to decrease the blood pressure acutely, this is because a higher blood pressure may be required to drive the same cerebral perfusion pressure.

Guidelines on the management of Subarachnoid Haemorrhage

<http://stroke.ahajournals.org/content/40/3/994.full>

A 54-year-old male patient has been brought in by ambulance after falling down the stairs. He complains of immediate onset of back pain and right leg weakness following the fall. On examination, there is weakness of all muscle groups of right hip and leg. There is loss of proprioception and vibration sense in the distribution of L1-S5 of the right hip and lower limb. There is loss of pain and temperature sensation in the distribution of L1-S5 of the left hip and lower limb.

What is the diagnosis?

- ☐ Anterior cord syndrome
- ☐ Central cord syndrome
- ☐ Posterior cord syndrome
- ☐ Brown-Sequard syndrome
- ☐ Cauda-equina syndrome



Brown-Sequard syndrome: ipsilateral weakness, loss of proprioception and vibration sensation, contralateral loss of pain and temperature sensation

Important for me Less important

Brown-Sequard syndrome: ipsilateral weakness, loss of proprioception and vibration sensation, contralateral loss of pain and temperature sensation.

Central cord syndrome usually presents with bilateral motor weakness.

Anterior cord syndrome usually affects motor function, pain and temperature sensation. Proprioception is usually spared.

Posterior cord syndrome usually affects proprioception.

Cauda-equina syndrome usually causes bladder/bowel dysfunction and saddle anaesthesia.

A 22-year-old man complains of hearing problems. You perform an examination of his auditory system including Rinne's and Weber's test:

Rinne's test:	Left ear: bone conduction > air conduction Right ear: air conduction > bone conduction
Weber's test:	Lateralises to the left side

What do these tests imply?

- ☐ Normal hearing
- ☐ Left conductive deafness
- ☐ Right conductive deafness
- ☐ Left sensorineural deafness
- ☐ Right sensorineural deafness

Normal hearing

3%

Left conductive deafness

58%

Right conductive deafness

10%

Left sensorineural deafness

16%

Right sensorineural deafness

13%

A 61-year-old female with a long-standing history of type 2 diabetes mellitus, hypertension and hypercholesterolemia developed a sudden onset weakness of her right lower leg while preparing breakfast. Her son brought her to the emergency department where she told the attending doctor that she had a similar episode two days ago but resolved after 1 hour. She can speak well and fully understand what the doctor tells her. On examination, the doctor finds that the patient also had decreased touch sensation on her right leg. A non-contrast computed tomography (CT) scan is unremarkable but a repeat CT scan after 12 hours showed an area of hypo-attenuation in a region of the brain. Which of the following arteries of the cerebral circulation is the most likely to be occluded in this patient?

- ☐ Posterior cerebral artery
- ☐ Anterior cerebral artery
- ☐ Middle cerebral artery
- ☐ Basilar artery
- ☐ Posterior inferior cerebellar artery

Posterior cerebral artery	7%
Anterior cerebral artery	52%
Middle cerebral artery	25%
Basilar artery	6%
Posterior inferior cerebellar artery	10%

Contralateral hemiparesis and sensory loss with the lower extremity being more affected than the upper - anterior cerebral artery

Important for me Less important

The most likely diagnosis in this patient is a stroke given the long history of diabetes, hypertension, and hypercholesterolemia which are all risk factors for an ischemic stroke. There is also a likely episode of a transient ischemic attack in this patient, which is an episode of stroke-like symptoms resolving in less than 24 hours. There are no risk factors for a hemorrhagic stroke in this patient, such as the use of warfarin or a blood clotting disorder. An ischemic stroke is usually only seen on CT at the earliest after 6 hours following an ischemic episode and this explains why the CT scan was unremarkable at the time of admission. However, 12 hours later the brain tissue swells and this produces an area of hypo-attenuation visible on CT scan.

- 1: An ischemic stroke due to an obstruction of the posterior cerebral artery would result in a contralateral hemianopia with macular sparing. This is because the posterior cerebral artery supplies blood to occipital lobe which is responsible for visual processing. However, the region receiving information from the macula also has a dual blood supply from the deep branches of the middle cerebral artery.
- 2: The anterior cerebral artery supplies the motor and sensory cortices preferably on the medial side of the cerebral hemisphere and results in symptoms in the lower limbs.
- 3: The middle cerebral artery supplies the motor and sensory cortices but would be more likely to affect the region supplying the upper limbs than the lower limbs. The face can also be affected when the middle cerebral artery is occluded resulting in a unilateral droop. In addition, the language centers can be affected if the stroke occurs on the dominant side of the brain or hemineglect can happen if the stroke occurs on the non-dominant side.
- 4: An Ischemic stroke of the areas supplied by the basilar artery can result in more severe neurological impairment such as locked-in syndrome or quadriplegia. This is because of the extremely important areas of the brainstem such as the pons, medulla, and midbrain which receive blood from the basilar artery.
- 5: An occlusion of the posterior inferior cerebellar artery would have produced swallowing impairment, hoarseness of the voice as well as a loss of the gag reflex.

A 76-year-old man is admitted with a right hemiparesis. He first noticed weakness on his right side around six hours ago. A CT scan shows an ischaemic stroke and aspirin 300mg is commenced. terms of further management in the acute phase, which one of the following values should not be corrected?

- ☐ BP 210/110
- ☐ Blood glucose 11.2 mmol/l
- ☐ Oxygen saturation 93%
- ☐ Temp 38.3°C
- ☐ Blood glucose 3.5 mmol/l

BP 210/110

56%

Blood glucose 11.2 mmol/l

20%

Oxygen saturation 93%

10%

Temp 38.3°C

6%

Blood glucose 3.5 mmol/l

8%

Hypertension should not be treated in the initial period following a stroke

Important for me Less important

Elevated blood pressure should not be treated in the acute phase following a stroke unless complications develop. Other physiological parameters should be kept within normal limits - an aggressive approach with respect to this has been shown to improve outcome

Dr. P. Sem

Which one of the following is least recognised as an adverse effect of phenytoin use?

- ☐ Megaloblastic anaemia
- ☐ Peripheral neuropathy
- ☐ Alopecia
- ☐ Osteomalacia
- ☐ Coarsening of facial features



Phenytoin is associated with hirsutism, rather than alopecia

A 67-year-old male undergoes investigations for bilateral paraesthesia in the radial aspects of both hands, over the thumbs and first fingers. He also has paraesthesia in the lateral aspects of both forearms and lower limb spasticity. Blood tests reveal a HBA1c of 46 mmol/mol. He undergoes nerve conduction studies and EMG with evidence of denervation. Which ONE of the following diagnoses is most likely?

- ☐ Bilateral carpal tunnel syndrome
- ☐ Degenerative cervical myelopathy
- ☐ Multiple sclerosis
- ☐ Syringomyelia
- ☐ Diabetic neuropathy

Bilateral carpal tunnel syndrome	5%
Degenerative cervical myelopathy	56%
Multiple sclerosis	9%
Syringomyelia	18%
Diabetic neuropathy	12%

This patients twitches are probably fibrillations, a sign of lower motor neuron dysfunction. This is confirmed on the neurophysiology report, with evidence of denervation. His symptoms are predominantly in the C6 dermatome distribution bilaterally. Although median nerve compression at the elbow bilaterally could in theory produce his symptoms, it would be less likely to explain his symptoms given his age. He is likely to have degenerative cervical myelopathy. This condition is associated with a delay in diagnosis, estimated to be >2 years in some studies [1].

- Patients with degenerative cervical myelopathy can present with a number of problems [2]:
- Pain/stiffness: affecting the neck, upper and/or lower limbs. Lhermittes sign is a sharp pain radiating down the spine on flexion of the neck, which is classically associated with multiple sclerosis, though it can occur in cervical myelopathy.
 - Loss of function: Clumsiness (e.g. cant do shirt buttons, hold cup), leg weakness leading to impaired gait, imbalance and falls.
 - Sphincter disturbance: this can range from frequency and urgency to incontinence.

Neurological examination can reveal lower motor neuron signs at the level of the lesion and upper motor neuron signs below. Note that neurological signs can be subtle and a high degree of suspicion is needed [2].

- The other answers in this question are unlikely for the following reasons:
- A: bilateral carpal tunnel syndrome would not cause forearm symptoms. Carpal tunnel syndrome results from median nerve compression at the wrist and results in a lower motor neuron picture, with thenar muscle wasting and weakness of the LOAF muscles (lateral lumbricals, opponens pollicis, abductor pollicis brevis and flexor pollicis brevis). Tinels test and Phalens test can be positive.
 - C: multiple sclerosis (MS) is rare in this age group. MS predominantly affects woman (3-4 times common) and usually presents before the age of 45. It can have a variable presentation, affecting both the sensory and/or motor systems. Inflammatory changes are often present at multiple sites, which can cause symptoms at more than one site; a dissociated sensory loss, that is numbness at different and unlinked sites, is a hallmark of MS. Often patients will recall previous episodes of odd neurological deficits, which resolved.
 - D: Syringomyelia refers to the development of a syrinx in the spinal cord. It presents with a central cord syndrome, with predominantly upper limb signs. It is a relatively uncommon condition.
 - E: His HBA1c is not within the diagnostic range of diabetes mellitus. Diabetes mellitus can cause a peripheral neuropathy presenting in a glove and stocking distribution, as well as neuropathy of peripheral nerves - mononeuritis multiplex.

References:

1. Behrbalk E, Salame K, Regev GJ, Keynan O, Boszczyk B, Lidar Z. Delayed diagnosis of cervical spondylotic myelopathy by primary care physicians. Neurosurg Focus. 2013 Jul;35(1):E1.
2. Baron EM, Young WF. Cervical spondylotic myelopathy: a brief review of its pathophysiology, clinical course, and diagnosis. Neurosurgery. 2007 Jan;60(1 Suppl 1):S35-41.

A 21-year-old female is seen in the first seizure clinic in the outpatient department. Both the EEG and MRI brain are normal. A decision is made not to start her on anti-epileptic medication. What restrictions on driving should she be informed about?

- ☐ No restrictions but inform DVLA
- ☐ No restrictions, no need to inform DVLA if not on medication
- ☐ Cannot drive for 1 month from date of seizure
- ☐ Cannot drive for 6 months from date of seizure
- ☐ Cannot drive for 1 year from date of seizure

No restrictions but inform DVLA

11%

No restrictions, no need to inform DVLA if not on medication

9%

Cannot drive for 1 month from date of seizure

17%

Cannot drive for 6 months from date of seizure

44%

Cannot drive for 1 year from date of seizure

19%

Patients cannot drive for 6 months following a seizure

Important for me Less important

Which one of the following is least recognised as a cause of autonomic neuropathy

☐ Guillain-Barre syndrome

☐ New variant CJD

☐ Diabetes

☐ Parkinson's

☐ HIV

Guillain-Barre syndrome

23%

New variant CJD

38%

Diabetes

7%

Parkinson's

18%

HIV

14%

A 32-year-old woman is brought into the emergency department by ambulance with following an episode in of vertigo, diplopia and dysarthria, after which she became drowsy and responsive to pain only. Her symptoms came on over ten minutes and lasted for approximately one hour. Her initial symptoms have now fully resolved, but she feels nauseous. Neurological examination is unremarkable. She has a past medical history of migraine. She takes the progesterone-only contraceptive pill, but no other medications.

What is the most likely diagnosis?

- ☐ Simple partial seizure
- ☐ Complex partial seizure
- ☐ Migraine with brainstem aura
- ☐ Transient ischaemic attack
- ☐ Multiple sclerosis

Simple partial seizure	5%
Complex partial seizure	14%
Migraine with brainstem aura	47%
Transient ischaemic attack	30%
Multiple sclerosis	4%

Stroke and TIA are associated with sudden-onset 'negative' symptoms, migraine is more commonly associated with 'positive' symptoms

Important for me Less important

Migraine is common, with a prevalence of approximately 10% of the population. Therefore, even rare presentation of migraine may occur more commonly than common presentations of rarer conditions. This is migraine with brainstem aura (basilar-type migraine, or Bickerstaff's Syndrome). The gradual onset over ten minutes, and step-wise progression of symptoms point more towards migraine than an ischaemic event. A reminder that it is possible for migraine aura to occur without the subsequent headache, as in this case. New-onset seizures would be less likely than an atypical presentation of known migraine. Multiple sclerosis would not present like this.

A 56-year-old woman comes for review. Around 4 weeks ago she had a blistering rash under her right breast which extended around to the back. A diagnosis of shingles was made. Unfortunately since that time she has been experiencing severe 'shooting' pains. The skin is also very tender to touch. Neither paracetamol nor ibuprofen have helped her symptoms. What is the most appropriate next step in management?

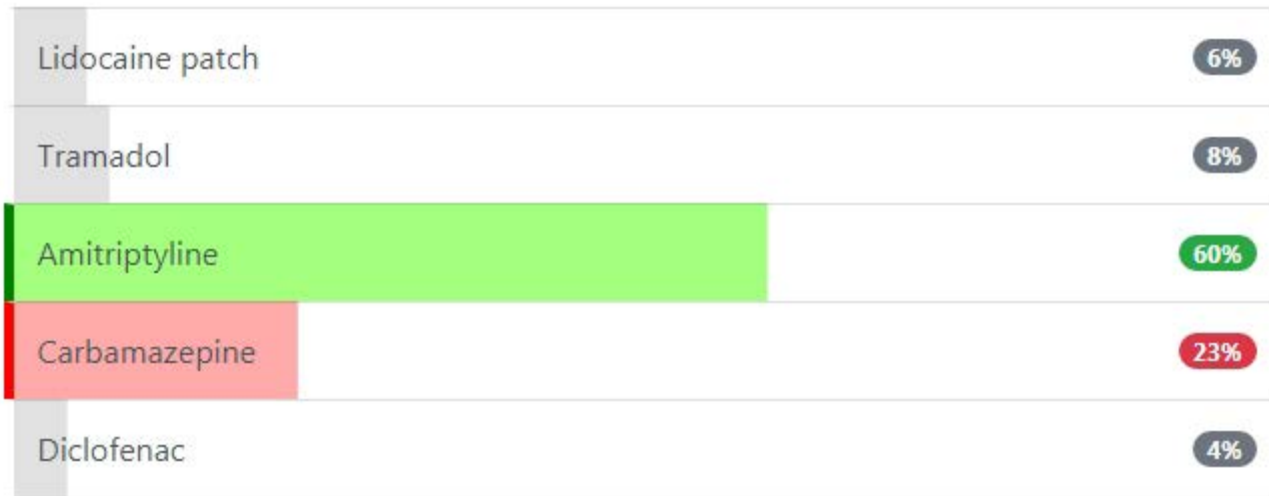
☐ Lidocaine patch

☐ Tramadol

☐ Amitriptyline

☐ Carbamazepine

☐ Diclofenac



This lady has developed post-herpetic neuralgia. NICE recommend using amitriptyline, duloxetine, gabapentin or pregabalin first-line.

A 45-year-old woman presents complaining of visual disturbance. Examination reveals a left congruous homonymous hemianopia. Where is the lesion most likely to be?

- ☐ Optic chiasm
- ☐ Left occipital cortex
- ☐ Right optic tract
- ☐ Right occipital cortex
- ☐ Left optic tract

Optic chiasm

5%

Left occipital cortex

6%

Right optic tract

33%

Right occipital cortex

48%

Left optic tract

8%

Visual field defects:

- left homonymous hemianopia means visual field defect to the left, i.e. lesion of right optic tract
- homonymous quadrantanopias: PITS (Parietal-Inferior, Temporal-Superior)
- incongruous defects = optic tract lesion; congruous defects = optic radiation lesion or occipital cortex

Important for me Less important

A 33-year-old man is seen in the Emergency Department with a fall. He is a known alcoholic and drank a bottle of vodka and 2 cans of cider in the last 24 hours. He is started on a chlordiazepoxide reducing regimen by the junior doctor. He is post-taken by the medical consultant who examines him requests that he is urgently started on Pabrinex as he has features consistent with Wernicke's encephalopathy.

Which of the following is a feature of Wernicke's encephalopathy?

- ☐ Dysarthria
- ☐ Retrograde amnesia
- ☐ Ophthalmoplegia
- ☐ Confabulation
- ☐ Tremor

Dysarthria	8%
Retrograde amnesia	9%
Ophthalmoplegia	54%
Confabulation	22%
Tremor	7%

Confusion, ataxia, nystagmus + ophthalmoplegia are features of Wernicke's encephalopathy

Important for me Less important

A useful mnemonic to remember the features of Wernicke's encephalopathy is **CAN**

OPEN

Confusion

Ataxia

Nystagmus

Ophthalmoplegia

Peripheral

Neuropathy

Retrograde amnesia and confabulation are features of Korsakoff's psychosis

Dysarthria and tremor are multifactorial symptom of neurological/systemic disease

Dr Assem

A 61-year-old woman presents with bilateral tinnitus. She reports no change in her hearing or other ear-related symptoms. Ear and cranial nerve examination is unremarkable. Which medication is she most likely to have recently started?

- ☐ Ciprofloxacin
- ☐ Nifedipine
- ☐ Repaglinide
- ☐ Quinine
- ☐ Bendroflumethiazide

Ciprofloxacin

17%

Nifedipine

8%

Repaglinide

8%

Quinine

46%

Bendroflumethiazide

22%

A 58 year old gentleman presents with left sided paraesthesias affecting his thumb and first finger. He complains of grip weakness and dropping objects unintentionally. On examination, there is wasting over the thenar eminence. Which of the following signs would suggest a diagnosis other than carpal tunnel syndrome?

- ☐ Positive Hoffmans sign
- ☐ Thenar muscle wasting
- ☐ Unilateral weakness of pincer grip
- ☐ Positive Phalens test
- ☐ Positive Tinnels test

Positive Hoffmans sign	62%
Thenar muscle wasting	12%
Unilateral weakness of pincer grip	7%
Positive Phalens test	10%
Positive Tinnels test	9%

A positive Hoffmans sign is a sign of upper motor neuron dysfunction and points to a disease of the central nervous system - in this case from the history degenerative cervical myelopathy [DCM] affecting the cervical spinal cord is most likely. To elicit it, the examiner should flick the patients distal phalanx (usually of the middle finger) to cause momentary flexion. A positive sign is exaggerated flexion of the thumb.

DCM is often missed initially and there is a delay in the diagnosis of this condition by >2 years in some studies [1]. This is a problem as delayed treatment limits recovery. It is most commonly misdiagnosed as carpal tunnel syndrome and in one study, 43% of patients who underwent surgery for degenerative cervical myelopathy, had been initially diagnosed with carpal tunnel syndrome [1]. DCM is therefore an important differential in patients suspected to have Carpal Tunnel Syndrome [CTS].

CTS is a disease of the peripheral nervous system, resulting from median nerve compression at the wrist inside the carpal tunnel. It therefore affects only the aspects of the hand innervated by the median nerve:

- Sensation; Thumb / Index / Middle Finger. This typically manifests as intermittent pain or parasthesiae.
- Motor; LOAF Muscles(lateral lumbricals, opponens pollicis, abductor pollicis brevis and flexor pollicis brevis). Motor signs are less commonly seen with presentations of CTS, but wasting of the thenar eminence may be present.

Tinels test and Phalens test can be positive, but not always. Both tests aim to increase the pressure within the carpal tunnel, to try to exacerbate symptoms; Tinels test via tapping on it and Phalens test by sustained full flexion of the wrist.

In focal central nervous system disorders, like DCM, examination features are known to have low sensitivity but high specificity [2]. As a disease of the cervical spinal cord, DCM can affect the sensory, motor and autonomic nervous systems from the neck downwards. Motor signs will be upper motor neuron signs such as increased toned, hyper-reflexia and pyramidal weakness. Note that the neurological signs of DCM are often subtle initially and easily missed, but as a progressive condition they are likely to get worse [3]. Therefore detecting early DCM can be challenging. A high index of suspicion, alongside a comprehensive neurological examination and monitoring for progression is required.

References:

1. Behrbalk E, Salame K, Regev GJ, Keynan O, Boszczyk B, Lidar Z. Delayed diagnosis of cervical spondylotic myelopathy by primary care physicians. *Neurosurg Focus*. 2013 Jul;35(1):E1.
2. Nicholl DJ, Appleton JP. Clinical neurology: why this still matters in the 21st century. *Journal of Neurology, Neurosurgery & Psychiatry* 2015;86:229-33.
3. Baron EM, Young WF. Cervical spondylotic myelopathy: a brief review of its pathophysiology, clinical course, and diagnosis. *Neurosurgery*. 2007 Jan;60(1 Supp1 1):S35-41.

A 33-year-old man presents complaining of visual disturbance. Examination reveals a bitemporal hemianopia with predominately the upper quadrants being affected. What is the most likely lesion?

- ☐ Craniopharyngioma
- ☐ Brainstem lesion
- ☐ Pituitary macroadenoma
- ☐ Frontal lobe lesion
- ☐ Right occipital lesion

Craniopharyngioma	22%
Brainstem lesion	3%
Pituitary macroadenoma	67%
Frontal lobe lesion	4%
Right occipital lesion	4%

Bitemporal hemianopia

- lesion of optic chiasm
- upper quadrant defect > lower quadrant defect = inferior chiasmal compression, commonly a pituitary tumour
- lower quadrant defect > upper quadrant defect = superior chiasmal compression, commonly a craniopharyngioma

Important for me Less important

An upper quadrant defect implies inferior chiasmal compression making a pituitary macroadenoma the most likely diagnosis

A 34-year-old female with a history of primary generalised epilepsy asks for advice in the neurology clinic as she plans to start a family. She currently takes sodium valproate as monotherapy. What advice should be given regarding the prevention of neural tube defects?

- ☐ Folic acid 400 mcg per day once pregnancy has been confirmed
- ☐ Folic acid 1 mg per day once pregnancy has been confirmed
- ☐ Folic acid 5 mg per day starting now
- ☐ Folic acid 10 mg per day starting now
- ☐ Folic acid 400 mcg per day starting now

Folic acid 400 mcg per day once pregnancy has been confirmed

6%

Folic acid 1 mg per day once pregnancy has been confirmed

6%

Folic acid 5 mg per day starting now

67%

Folic acid 10 mg per day starting now

9%

Folic acid 400 mcg per day starting now

13%

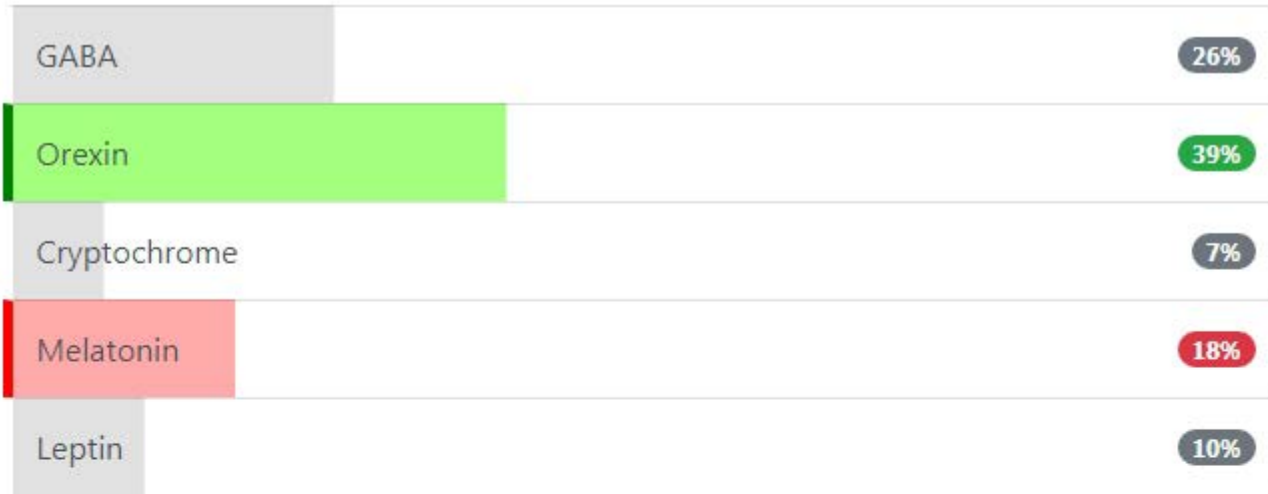
Epilepsy + pregnancy = 5mg folic acid

Important for me Less important

You see a 23-year-old man who complains of sudden unavoidable urges to sleep. When these occur, he can collapse on the spot and immediately lose consciousness. This can be brought on by strong emotions such as fear or laughter.

Which of the following neuropeptides is low in this condition?

- ☐ GABA
- ☐ Orexin
- ☐ Cryptochrome
- ☐ Melatonin
- ☐ Leptin



Narcolepsy is associated with low orexin (hypocretin) levels

Important for me Less important

This condition is narcolepsy. It is characterised by daytime somnolence and dysregulation of sleep. 70% also have cataplexy - a condition in which sudden emotions can trigger collapsing episodes. It is theorised this is due to the destruction of neurons that produce orexin (hypocretin), which promotes wakefulness.

Cryptochrome is also involved in sleep - mostly in how light influences the sleep cycle. Melatonin is a hormone released by the pineal gland that leads to the feeling of sleepiness. Leptin is a neuropeptide most associated with regulating the sensation of hunger.

A 31-year-old female with a history of epilepsy consults you following an uneventful pregnancy. Which one of the following drugs would it be safe to continue during breast feeding?

- ☐ Phenytoin
- ☐ Carbamazepine
- ☐ Lamotrigine
- ☐ Sodium valproate
- ☐ All of the above



Breast feeding is acceptable with nearly all anti-epileptic drugs

Important for me Less important

The BNF states 'breast-feeding is acceptable with all antiepileptic drugs, taken in normal doses, with the possible exception of barbiturates'

Which one of the following is least characteristic of Wernicke's encephalopathy?

☐ Ataxia

☐ Confusion

☐ Ophthalmoplegia

☐ Confabulation

☐ Nystagmus



An inability to acquire new memories and confabulation suggests the development of Korsakoff's syndrome

A 28-year-old woman is brought by Emergency ambulance to the hospital. She is accompanied by her husband who tells you that his wife has suffered a progressive flu like illness over the past few days. Over the past 24hrs she has begun to develop short term memory problems, been behaving oddly, and has now developed worsening drowsiness and disorientation. On examination her Glasgow Coma Scale is 13. You confirm confused, rambling speech. She has neck stiffness, fundoscopy is unremarkable.

Investigations

Hb	130 g/l	Na ⁺	134 mmol/l
Platelets	182 * 10 ⁹ /l	K ⁺	4.7 mmol/l
WBC	9.2 * 10 ⁹ /l	Urea	5.9 mmol/l
Neuts	2.8 * 10 ⁹ /l	Creatinine	92 µmol/l
Lymphs	5.8 * 10 ⁹ /l	CRP	61 mg/l
Eosin	0.4 * 10 ⁹ /l		

Which of the following is the most likely underlying diagnosis?

- ☐ Herpes encephalitis
- ☐ Meningococcal meningitis
- ☐ Severe influenza
- ☐ Measles encephalitis
- ☐ Tuberculous meningitis

Herpes encephalitis

64%

Meningococcal meningitis

16%

Severe influenza

7%

Measles encephalitis

8%

Tuberculous meningitis

6%

The progressive confusion seen here with memory loss, lymphocytosis and a moderate elevation of CRP, following a flu like illness, fits well with a diagnosis of herpes encephalitis. MRI brain is the investigation of choice initially, which should demonstrate temporal lobe changes, although often CT only is available out of hours. CSF lymphocytosis is seen, there is a mild elevation in protein and glucose is either normal or slightly decreased. IV acyclovir is the intervention of choice.

Meningococcal meningitis isn't suggested because of the peripheral blood lymphocytosis, and the lack of features of meningococcal bacteraemia such as a skin rash. Measles encephalitis is associated with a subacute presentation of gradual memory loss, and tuberculous meningitis seems less likely given we are provided with no history of respiratory symptoms, or possible TB exposure. Severe influenza with encephalitis is a possible differential, although a predilection for memory loss would be unusual.

Which one of the following dopamine receptor agonists used in the management of Parkinson's disease is least associated with pulmonary, retroperitoneal and pericardial fibrosis?

- ☐ Pergolide
- ☐ Lisuride
- ☐ Bromocriptine
- ☐ Cabergoline
- ☐ Ropinirole

Pergolide

11%

Lisuride

13%

Bromocriptine

16%

Cabergoline

10%

Ropinirole

50%

Dr. Arsem

A 63-year-old female is reviewed in the rapid access transient ischaemic attack clinic. For the past three weeks she has been having episodes of transient loss of vision in the right eye. Carotid ultrasound reveals a 48% stenosis of her right carotid artery and an ECG shows sinus rhythm. She was started on aspirin 300mg od by her own GP after the first episode. What is the most appropriate management of this patient?

- ☐ Warfarin
- ☐ Clopidogrel
- ☐ Carotid endarterectomy
- ☐ Dipyridamole
- ☐ Aspirin and dipyridamole

Warfarin	6%
Clopidogrel	52%
Carotid endarterectomy	24%
Dipyridamole	4%
Aspirin and dipyridamole	15%

Antiplatelets

- TIA: clopidogrel
- ischaemic stroke: clopidogrel

Important for me Less important

Carotid artery endarterectomy is recommended if the patient has suffered a stroke or TIA in the carotid territory and is not severely disabled. It should only be considered if the carotid stenosis is greater than 70% or 50%, depending on the reporting criteria used - please see below.

NICE Clinical Knowledge Summaries state the following:

Antiplatelet therapy is initiated by secondary care on diagnosis of ischaemic stroke or TIA without paroxysmal or permanent atrial fibrillation for long-term vascular prevention:

- The standard treatment is clopidogrel 75mg daily (licensed for use in ischaemic stroke, off-label use in TIA).
- Modified-release dipyridamole 200 mg twice daily may be used if both clopidogrel and aspirin are contraindicated or cannot be tolerated.
- Aspirin 75mg daily may be used if both clopidogrel and modified-release dipyridamole are contraindicated or cannot be tolerated.
- Aspirin 75 mg daily with modified-release dipyridamole 200 mg twice daily may be used if clopidogrel cannot be tolerated.

The 2012 Royal College of Physicians National clinical guidelines for stroke now recommend using clopidogrel following a TIA. This brings it in line with current stroke guidance.

A 25-year-old female patient presents to the GP surgery with hearing loss. She reports that her hearing has been gradually declining to the point that it is now affecting her work as a secretary. She also complains of ringing in the left ear at times but denies pain or discharge from either ear. Her mother also has hearing loss at a young age but she's not sure what the cause was. You perform the following tests:

Weber test	not localising to either side
------------	-------------------------------

	Right ear	Left ear
Rinne test	bone conduction > air conduction	bone conduction > air conduction

What is the most likely diagnosis?

- ☐ Otitis media with effusion
- ☐ Otosclerosis
- ☐ Cerumen impaction
- ☐ Cholesteatoma
- ☐ Stickler syndrome

Otitis media with effusion	5%
Otosclerosis	56%
Cerumen impaction	9%
Cholesteatoma	11%
Stickler syndrome	18%

Otosclerosis is characterised by conductive hearing loss, tinnitus and positive family history

Important for me Less important

The Weber and Rinne test showed a bilateral conductive hearing loss. This, in combination with the history of tinnitus and positive family history, points towards otosclerosis as the likely diagnosis.

Otitis media with effusion can also cause conductive hearing loss but typically there is a history of otitis media and more common in children.

Cerumen impaction can cause conductive hearing loss, however, given the positive family history, otosclerosis is more likely.

Cholesteatoma can cause conductive hearing loss but it does not fit with the bilateral hearing loss with a positive family history.

Stickler syndrome is a cause of sensorineural hearing loss.

A 70-year-old man who presented with repetitive large involuntary movements of right his lower limb and right upper limb has been diagnosed with hemiballismus. This affects which part of the brain?

- ☐ Medial thalamus and mammillary bodies of the hypothalamus
- ☐ Subthalamic nucleus of the basal ganglia
- ☐ Amygdala
- ☐ Substantia nigra of the basal ganglia
- ☐ Striatum (caudate nucleus) of the basal ganglia

Medial thalamus and mammillary bodies of the hypothalamus

8%

Subthalamic nucleus of the basal ganglia

64%

Amygdala

6%

Substantia nigra of the basal ganglia

8%

Striatum (caudate nucleus) of the basal ganglia

13%

Subthalamic nucleus of the basal ganglia lesions may cause hemiballism

Important for me Less important

Hemiballism is a type of chorea which is caused by a decreased activity in the subthalamic nucleus of the basal ganglia in most cases.

The other areas of the brain are associated with other conditions. Wernicke and Korsakoff syndrome localises to the medial thalamus and mammillary bodies of the hypothalamus. Huntington chorea is localised to the striatum (caudate nucleus) of the basal ganglia. Parkinson's disease is caused by disease of the substantia nigra of the basal ganglia. Kluver-Bucy syndrome is caused by damage both temporal lobes including the amygdala.

A 19-year-old man is diagnosed as having myoclonic seizures. What is the most appropriate first-line antiepileptic?

☐ Sodium valproate

☐ Carbamazepine

☐ Topiramate

☐ Clonazepam

☐ Ethosuximide

Sodium valproate

61%

Carbamazepine

19%

Topiramate

5%

Clonazepam

8%

Ethosuximide

7%

Myoclonic seizures - sodium valproate

Important for me Less important

A 47-year-old man with a known history of schizophrenia is admitted to the Emergency Department due to confusion. A bottle of procyclidine tablets are found in his pocket. On examination the temperature is 38.1°C with a blood pressure of 155/100 mmHg. Neurological examination reveals a GCS of 13/15 but assessment of his peripheral nervous system is difficult due to generalised increased muscle tone. What is the most likely diagnosis?

- ☐ Neuroleptic malignant syndrome
- ☐ Procyclidine overdose
- ☐ Catatonic schizophrenia
- ☐ Clozapine induced agranulocytosis
- ☐ Quetiapine induced rhabdomyolysis

Neuroleptic malignant syndrome

87%

Procyclidine overdose

6%

Catatonic schizophrenia

3%

Clozapine induced agranulocytosis

2%

Quetiapine induced rhabdomyolysis

2%

Which one of the following is least associated with myotonic dystrophy?

- ☐ Dysphagia
- ☐ Aortic regurgitation
- ☐ Diabetes mellitus
- ☐ Testicular atrophy
- ☐ Learning difficulties

Dysphagia

12%

Aortic regurgitation

45%

Diabetes mellitus

10%

Testicular atrophy

20%

Learning difficulties

13%

Dystrophia myotonica - **DM1**

- **d**istal weakness initially
- autosomal **d**ominant
- **d**iabetes
- **d**ysarthria

Important for me Less important

You are a foundation doctor working in general practice. You review a forty-year-old woman complaining of dizziness. Symptoms are worse when rolling over in bed and are associated with nausea. She has never had any previous episodes, does not complain of aural fullness and does not have nystagmus.

What could be done to confirm the diagnosis?

- ☐ Audiogram
- ☐ Rinne and weber tests
- ☐ Otoscopy
- ☐ Dix-Hallpike manoeuvre
- ☐ Epley manoeuvre

Submit answer

Audiogram	6%
Rinne and weber tests	9%
Otoscopy	7%
Dix–Hallpike manoeuvre	61%
Epley manoeuvre	16%

Dix–Hallpike test: rapidly lower a patient to the supine position with an extended neck. A positive test recreates the symptoms of benign paroxysmal positional vertigo

Important for me [Less important](#)

This patient likely has a case of Benign paroxysmal positional vertigo. Dix–Hallpike test helps to confirm the diagnosis whereas the Epley manoeuvre can be used as a non medical treatment.

If Ménière's disease was suspected then an audiogram would be appropriate. However this patient appears to have simple vertigo. Ménière's disease would likely present with recurrent episodes of vertigo, tinnitus and hearing loss. There may be an associated feeling of aural fullness.

Rinne and weber tests would identify any hearing loss. Although useful this test would not confirm the diagnosis of benign paroxysmal positional vertigo.

Otoscopy would identify any outer or middle ear infection. This can be associated with labyrinthitis however labyrinthitis is likely to cause nystagmus in addition to vertigo and nausea.

Discuss

Improve

[Next question >](#)

Benign paroxysmal positional vertigo

Benign paroxysmal positional vertigo (BPPV) is one of the most common causes of vertigo encountered. It is characterised by the sudden onset of dizziness and vertigo triggered by changes in head position. The average age of onset is 55 years and it is less common in younger patients.

Features

- vertigo triggered by change in head position (e.g. rolling over in bed or gazing upwards)
- may be associated with nausea
- each episode typically lasts 10-20 seconds
- positive Dix-Hallpike manoeuvre

BPPV has a good prognosis and usually resolves spontaneously after a few weeks to months. Symptomatic relief may be gained by:

- **Epley manoeuvre** (successful in around 80% of cases)
- teaching the patient exercises they can do themselves at home, termed vestibular rehabilitation, for example Brandt-Daroff exercises

Medication is often prescribed (e.g. Betahistine) but it tends to be of limited value.

Around half of people with BPPV will have a recurrence of symptoms 3–5 years after their diagnosis

A 64-year-old woman presents to her general practitioner with dizziness. When she rolls over in bed in the morning, she experiences sudden onset dizziness associated with nausea, which spontaneously resolves after around 20 seconds if she keeps her head still. After these episodes, the patient feels light-headed and unbalanced for several hours. She has suffered recurrent otitis media in the past and her family history is significant for otosclerosis.

What is the most important immediate investigation?

- ☐ Audiometry
- ☐ CT head
- ☐ Dix-Hallpike manoeuvre
- ☐ Epley manoeuvre
- ☐ MRI head

Submit answer

Audiometry	14%
CT head	15%
Dix-Hallpike manoeuvre	42%
Epley manoeuvre	10%
MRI head	19%

BPPV

- Dix-Hallpike manoeuvre is diagnostic
- Epley manoeuvre is for treatment

Important for me Less important

This is a typical history of benign paroxysmal positional vertigo (BPPV), which is diagnosed by performing Dix-Hallpike manoeuvre, which recreates the symptoms. The Epley manoeuvre is a therapeutic procedure that successfully resolves symptoms in ~80% of cases.

The recurrent otitis media and family history of otosclerosis are distractors.

Audiometry would be a useful investigation in Meniere's disease, as there is sensorineural hearing loss in this condition. A CT head would be useful in the diagnosis of otosclerosis, whilst an MRI scan of the head is the gold standard investigation for diagnosis of acoustic neuroma.

Discuss

Improve

Benign paroxysmal positional vertigo

Benign paroxysmal positional vertigo (BPPV) is one of the most common causes of vertigo encountered. It is characterised by the sudden onset of dizziness and vertigo triggered by changes in head position. The average age of onset is 55 years and it is less common in younger patients.

Features

- vertigo triggered by change in head position (e.g. rolling over in bed or gazing upwards)
- may be associated with nausea
- each episode typically lasts 10-20 seconds
- positive Dix-Hallpike manoeuvre

BPPV has a good prognosis and usually resolves spontaneously after a few weeks to months. Symptomatic relief may be gained by:

- **Epley manoeuvre** (successful in around 80% of cases)
- teaching the patient exercises they can do themselves at home, termed vestibular rehabilitation, for example Brandt-Daroff exercises

Medication is often prescribed (e.g. Betahistine) but it tends to be of limited value.

Around half of people with BPPV will have a recurrence of symptoms 3–5 years after their diagnosis

A 67-year-old male patient presents to the ophthalmology emergency department with sudden onset painless loss of vision in the right eye. He describes it as having a dense shadow over the vision, progressing from periphery to the centre. He has no past medical history of note.

What is the most likely diagnosis?

- ☐ Retinal detachment
- ☐ Vitreous haemorrhage
- ☐ Central retinal artery occlusion
- ☐ Central retinal vein occlusion
- ☐ Ischaemic optic neuropathy

Retinal detachment	61%
Vitreous haemorrhage	13%
Central retinal artery occlusion	9%
Central retinal vein occlusion	10%
Ischaemic optic neuropathy	6%

Retinal detachment is a cause of sudden painless loss of vision. It is characterised by a dense shadow starting peripherally and progressing centrally

Important for me Less important

Retinal detachment is a cause of sudden painless loss of vision. It is characterised by a dense shadow starting peripherally and progressing centrally.

Vitreous haemorrhage usually presents with dark spots.

Central retinal artery occlusion and central retinal vein occlusion does not usually present with progressing dense shadow.

This man's lack of ischaemic risk factors makes ischaemic optic neuropathy less likely.

During routine follow-up at renal clinic a man is noted to have corpuscular pigmentation of the left retina. Which one of the following conditions is associated with retinitis pigmentosa?

- ☐ Autosomal dominant polycystic kidney disease
- ☐ Tuberous sclerosis
- ☐ Von Hippel-Lindau syndrome
- ☐ Alport's syndrome
- ☐ Medullary sponge kidney

Autosomal dominant polycystic kidney disease

10%

Tuberous sclerosis

15%

Von Hippel-Lindau syndrome

18%

Alport's syndrome

52%

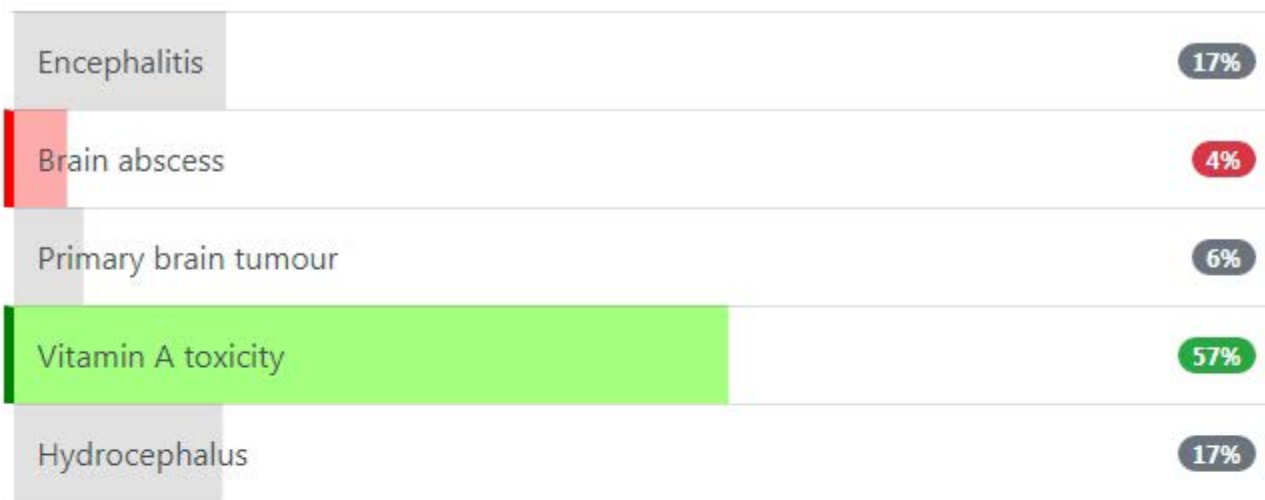
Medullary sponge kidney

6%

A 34-year-old female patient is brought into the emergency department by her husband. Husband reports that she has been confused in the last 3 days. She has a long-standing history of severe psoriasis but no other past medical history. Basic observations are all within normal range and a CT head is unremarkable. A fundoscopy reveals bilateral papilloedema.

What is the likely cause?

- ☐ Encephalitis
- ☐ Brain abscess
- ☐ Primary brain tumour
- ☐ Vitamin A toxicity
- ☐ Hydrocephalus



Vitamin A toxicity is a rare cause of papilloedema

Important for me Less important

Vitamin A toxicity is a rare cause of papilloedema. In this case, she is likely to have been taking retinoids for psoriasis.

Encephalitis does not usually present with papilloedema.

Brain abscess, brain tumour and hydrocephalus are all less likely with a normal CT head.

Which one of the following statements regarding macular degeneration is true?

- ☐ Drusen are characteristic of wet macular degeneration
- ☐ Photodynamic therapy is useful in dry macular degeneration
- ☐ Asian ethnicity is a risk factor
- ☐ Male sex is a risk factor
- ☐ Wet macular degeneration carries the worst prognosis

Drusen are characteristic of wet macular degeneration

9%

Photodynamic therapy is useful in dry macular degeneration

7%

Asian ethnicity is a risk factor

8%

Male sex is a risk factor

8%

Wet macular degeneration carries the worst prognosis

68%

Each one of the following is a cause of a mydriatic pupil, except:

- ☐ Third nerve palsy
- ☐ Atropine
- ☐ Holmes-Adie pupil
- ☐ Argyll-Robertson pupil
- ☐ Traumatic iridoplegia

Third nerve palsy	13%
Atropine	11%
Holmes-Adie pupil	13%
Argyll-Robertson pupil	54%
Traumatic iridoplegia	9%

Argyll-Robertson pupil is one of the classic pupillary syndrome. It is sometimes seen in neurosyphilis and is often said to be the prostitute's pupil - accommodates but doesn't react. Another mnemonic used for the Argyll-Robertson Pupil (ARP) is Accommodation Reflex Present (ARP) but Pupillary Reflex Absent (PRA)

Features

- small, irregular pupils
- no response to light but there is a response to accommodate

Causes

- diabetes mellitus
- syphilis

A 74-year-old man presents to ophthalmology clinic after seeing his optician. They have noticed raised intra-ocular pressure and decreased peripheral vision. His past medical history includes asthma and type 2 diabetes mellitus. What is the most appropriate treatment given the likely diagnosis?

- ☐ Latanoprost
- ☐ Pilocarpine
- ☐ Timolol
- ☐ Dorzolamide
- ☐ Brimonidine

Medication	Percentage
Latanoprost	43%
Pilocarpine	20%
Timolol	17%
Dorzolamide	16%
Brimonidine	4%

Latanoprost

43%

Pilocarpine

20%

Timolol

17%

Dorzolamide

16%

Brimonidine

4%

A prostaglandin analogue should be used first-line in patients with a history of asthma.

A 34-year-old female presents with fatigue and frequent headaches. On examination of her eyes, you notice an abnormality during the swinging light test. As the light is moved from the left to the right eye both pupils appear to dilate. The pupillary response to accommodation is normal bilaterally. Fundoscopy is also normal bilaterally. Her past medical history includes type one diabetes and hypertension. What is the most likely explanation for this patients' signs?

- ☐ Raised intracranial pressure
- ☐ Diabetic eye disease
- ☐ Holmes-Adie's pupil on the right
- ☐ Marcus-Gunn Pupil (relative afferent pupillary defect) on the right
- ☐ Argyll Robertson pupil on the right

Raised intracranial pressure	6%
Diabetic eye disease	6%
Holmes-Adie's pupil on the right	16%
Marcus-Gunn Pupil (relative afferent pupillary defect) on the right	53%
Argyll Robertson pupil on the right	18%

Marcus Gunn pupil (relative afferent pupillary defect) is diagnosed during the swinging light test. If there is damage to the afferent pathway (retina or optic nerve) of one eye, the pupil of that affected eye will abnormally dilate when a light is shone into it. This is because the consensual pupillary relaxation response from the healthy eye will dominate. Marcus Gunn pupil can be found in patients with multiple sclerosis. Therefore, given the history, this should be ruled out in this patient.

The history and examination findings in the question are not typical of raised intracranial pressure. Raised intracranial pressure may present with symptoms such as a headache, vomiting, bilateral blurred vision and seizures. Patients with increased intracranial pressure often have bilateral papilloedema on fundoscopy.

Although the history states the female is diabetic, there are typically normal pupillary light responses in patients with diabetic eye disease. Furthermore, with diabetic eye disease, you would expect to see some abnormality on fundoscopy.

Holmes-Aide's pupil is a dilated pupil which poorly (if at all) reacts to direct light, however, slowly reacts to accommodation. This does not correlate to the history.

The information given in the question above does not suggest Argyll Robertson pupil. This is characterised by a constricted pupil that does not respond to light but responds to accommodation. It is usually bilateral and is often associated with neurosyphilis.

Which one of the following is least associated with the development of optic atrophy?

- ☐ Ataxic telangiectasia
- ☐ Longstanding papilloedema
- ☐ Multiple sclerosis
- ☐ Glaucoma
- ☐ Retinitis pigmentosa

Ataxic telangiectasia

45%

Longstanding papilloedema

6%

Multiple sclerosis

11%

Glaucoma

10%

Retinitis pigmentosa

27%

Dr. Ssem

Which one of the following causes of Horner's syndrome is due to a lesion in the post-ganglionic part of the nerve supply?

☐ Internal carotid aneurysm

☐ Stroke

☐ Syringomyelia

☐ Pancoast's tumour

☐ Thyroidectomy

Internal carotid aneurysm

59%

Stroke

5%

Syringomyelia

7%

Pancoast's tumour

23%

Thyroidectomy

7%

Horner's syndrome - anhydrosis determines site of lesion:

- head, arm, trunk = central lesion: stroke, syringomyelia
- just face = pre-ganglionic lesion: Pancoast's, cervical rib
- absent = post-ganglionic lesion: carotid artery

Important for me Less important

A 45-year-old man presents to the Emergency Department following the sudden onset of pain in the right side of his face whilst hammering a nail into the wall. The pain is described as severe and constant. On examination he has a mild right ptosis and small right pupil. What is the most likely diagnosis?

- ☐ Trigeminal neuralgia
- ☐ Glaucoma
- ☐ Carotid artery dissection
- ☐ Syringomyelia
- ☐ Migraine

Trigeminal neuralgia	20%
Glaucoma	7%
Carotid artery dissection	54%
Syringomyelia	9%
Migraine	9%

This patient has Horner's syndrome caused by a carotid artery dissection. This may be caused by relatively benign trauma to the neck such as hyperextension whilst doing DIY. Cluster headache would be a differential diagnosis

A 19-year-old male presents to the emergency department with a 1-day history of redness around the left eye associated with puffiness of the eye and pain on eye movement. Overnight he reports feeling feverish. His vision is restricted due to an inability to open the eye. On examination, there is oedema surrounding upper and lower eyelids with erythema and proptosis. The eye itself appears normal with normal pupil reflexes but pain on eye movements. There is mildly raised intraocular pressure. He is normally fit and well but has recently been taking intranasal corticosteroid for sinusitis.

What is the most appropriate management?

- ☐ Refer for urgent (within 1 week) ophthalmology appointment
- ☐ Admit for intravenous antibiotics
- ☐ Refer for emergency (within 24 hours) ophthalmology appointment
- ☐ Discharge home with oral antibiotics
- ☐ Discharge home with topical antibiotics

Refer for urgent (within 1 week) ophthalmology appointment	7%
Admit for intravenous antibiotics	38%
Refer for emergency (within 24 hours) ophthalmology appointment	43%
Discharge home with oral antibiotics	6%
Discharge home with topical antibiotics	6%

Patients with orbital cellulitis require admission to hospital for IV antibiotics due to the risk of cavernous sinus thrombosis and intracranial spread

Important for me Less important

The correct answer here is to admit for intravenous antibiotics. This patient has orbital cellulitis which is a medical emergency due to risk of optic nerve damage, cavernous sinus thrombosis and intracranial spread. The systemic upset and pain on eye movements are clues pointing towards orbital as opposed to periorbital cellulitis. As the condition progresses patient can develop proptosis, relative afferent pupillary defect and raised intraocular pressure. There may also be globe displacement with resistance to retropulsion. Recent sinus infection or sinusitis is a risk factor for orbital cellulitis and points towards the diagnosis. In some hospitals, suitable patients may be ambulated with intravenous antibiotics as an alternative to admission.

Referring to an urgent (within 1 week) ophthalmology appointment would not be appropriate as this is a medical emergency.

Referring for an emergency (same day) ophthalmology appointment would be more appropriate than referring for an appointment within 1 week as it highlights the urgency of the situation, however, this patient should be admitted under the general medical take for intravenous antibiotics and should not be left without treatment for a period up to 24 hours. As such an outpatient appointment is not appropriate.

Discharging home with oral antibiotics may be appropriate if periorbital cellulitis was suspected. The inability to open the eye, pain on eye movements and history of fever point towards orbital cellulitis as opposed to periorbital cellulitis and so admission is required.

Topical antibiotics could be used in conjunctivitis but would not be appropriate in this case.

Which one of the following is not a feature of background diabetic retinopathy?

- ☐ Microaneurysms
- ☐ Blot haemorrhages
- ☐ Cotton wool spots
- ☐ Seen in both type 1 and type 2 diabetes mellitus
- ☐ Hard exudates

Microaneurysms

13%

Blot haemorrhages

14%

Cotton wool spots

36%

Seen in both type 1 and type 2 diabetes mellitus

11%

Hard exudates

26%

Cotton wool spots are seen in pre-proliferative retinopathy

An 84-year-old man presents with loss of vision in his left eye since the morning. He is otherwise asymptomatic and of note has had no associated eye pain or headaches. His past medical history includes ischaemic heart disease but he is otherwise well. On examination he has no vision in his left eye. The left pupil responds poorly to light but the consensual light reaction is normal. Fundoscopy reveals a red spot over a pale and opaque retina. What is the most likely diagnosis?

- ☐ Vitreous haemorrhage
- ☐ Retinal detachment
- ☐ Ischaemic optic neuropathy
- ☐ Central retinal vein occlusion
- ☐ Central retinal artery occlusion

Vitreous haemorrhage

6%

Retinal detachment

6%

Ischaemic optic neuropathy

11%

Central retinal vein occlusion

13%

Central retinal artery occlusion

64%

Which one of the following is associated with heterochromia in congenital disease?

- ☐ Holmes-Adie pupil
- ☐ Third nerve palsy
- ☐ Sixth nerve palsy
- ☐ Argyll-Robertson pupil
- ☐ Horner's syndrome

Holmes-Adie pupil

27%

Third nerve palsy

6%

Sixth nerve palsy

5%

Argyll-Robertson pupil

22%

Horner's syndrome

40%

A 67-year-old woman presents for review. She has recently been diagnosed with dry age-related macular degeneration. Which one of the following is the strongest risk factor for developing this condition?

☐ Hypertension

☐ Poor diet

☐ Smoking

☐ Diabetes mellitus

☐ Alcohol excess



Macular degeneration - smoking is risk factor

Important for me Less important

Having a balanced diet, with plenty of fresh fruits and vegetables may also slow the progression of macular degeneration. There is still ongoing research looking at the role of supplementary antioxidants

A 62-year-old man presents with sudden visual loss in his right eye. He is otherwise asymptomatic. Which one of the following conditions is least likely to be responsible?

- ☐ Ischaemic optic neuropathy
- ☐ Occlusion of the central retinal vein
- ☐ Occlusion of the central retinal artery
- ☐ Optic neuritis
- ☐ Vitreous haemorrhage

Ischaemic optic neuropathy

11%

Occlusion of the central retinal vein

10%

Occlusion of the central retinal artery

10%

Optic neuritis

60%

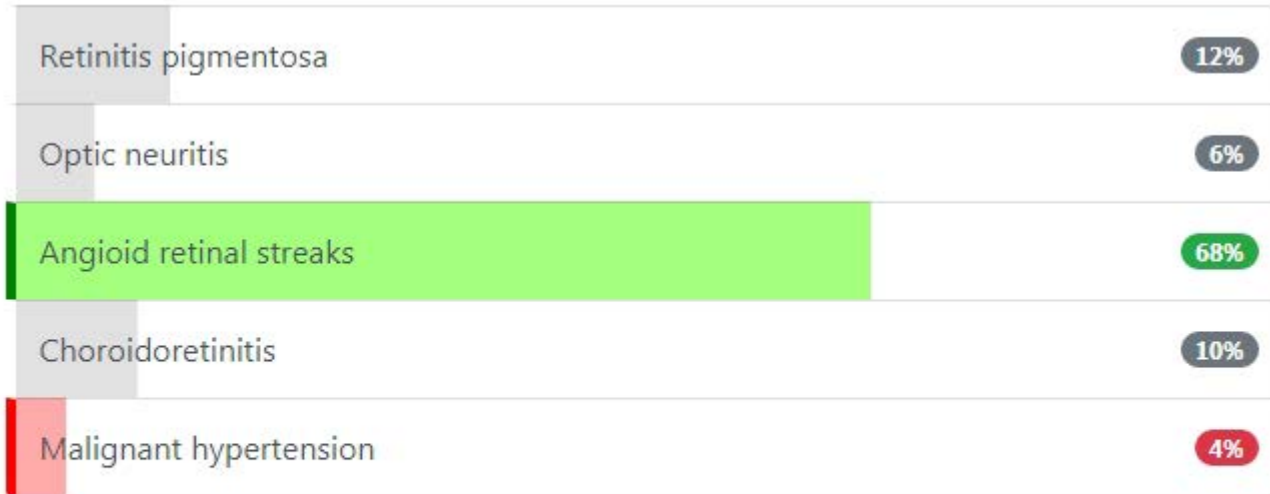
Vitreous haemorrhage

9%

Whilst optic neuritis can present with sudden loss, in this 62-year-old man it is the least likely option. Typically there is a unilateral decrease in visual acuity over hours or days. There may be poor discrimination of colours and eye pain on movement

A 65-year-old man with a known history of Paget's disease is noted to have irregular dark red lines radiating from the optic nerve. What is the likely diagnosis?

- ☐ Retinitis pigmentosa
- ☐ Optic neuritis
- ☐ Angioid retinal streaks
- ☐ Choroidoretinitis
- ☐ Malignant hypertension



This is a typical description of angioid retinal streaks which are associated with Paget's disease

A 40-year-old man presents with bilateral dry, gritty eyes. A diagnosis of blepharitis is considered. Which one of the following is least likely to be associated with blepharitis?

- ☐ Meibomian gland dysfunction
- ☐ Seborrhoeic dermatitis
- ☐ Staphylococcal infection
- ☐ Acne rosacea
- ☐ Viral upper respiratory tract infection

Meibomian gland dysfunction

11%

Seborrhoeic dermatitis

10%

Staphylococcal infection

12%

Acne rosacea

20%

Viral upper respiratory tract infection

47%

A 71-year-old man presents with a burning sensation around his right eye. On examination an erythematous blistering rash can be seen in the right trigeminal distribution. What is the most likely diagnosis?

- ☐ Ramsay Hunt syndrome
- ☐ Cluster headache
- ☐ Fungal keratitis
- ☐ Herpes zoster ophthalmicus
- ☐ Trigeminal neuralgia

Ramsay Hunt syndrome

14%

Cluster headache

2%

Fungal keratitis

3%

Herpes zoster ophthalmicus

76%

Trigeminal neuralgia

5%

A 35-year-old man presents with visual problems. He has had very poor vision in the dark for a long time but is now worried as he is developing 'tunnel vision'. He states his grandfather had a similar problem and was registered blind in his 50's. What is the most likely diagnosis?

- ☐ Leber's congenital amaurosis
- ☐ Vitelliform macular dystrophy
- ☐ Central serous retinopathy
- ☐ Primary open angle glaucoma
- ☐ Retinitis pigmentosa

Leber's congenital amaurosis

10%

Vitelliform macular dystrophy

7%

Central serous retinopathy

5%

Primary open angle glaucoma

10%

Retinitis pigmentosa

68%

Retinitis pigmentosa - night blindness + tunnel vision

Important for me Less important

A 65-year-old man with a history of primary open-angle glaucoma presents with sudden painless loss of vision in his right eye. On examination of the right eye the optic disc is swollen with multiple flame-shaped and blot haemorrhages. What is the most likely diagnosis?

- ☐ Diabetic retinopathy
- ☐ Vitreous haemorrhage
- ☐ Ischaemic optic neuropathy
- ☐ Occlusion of central retinal vein
- ☐ Occlusion of central retinal artery

Diabetic retinopathy

13%

Vitreous haemorrhage

20%

Ischaemic optic neuropathy

8%

Occlusion of central retinal vein

51%

Occlusion of central retinal artery

8%

Central retinal vein occlusion - sudden painless loss of vision, severe retinal haemorrhages on fundoscopy

Important for me Less important

A 63-year-old man presents to his GP complaining of pain in his right eye. On examination the sclera is red and the pupil is dilated with a hazy cornea. What is the most likely diagnosis?

- ☐ Scleritis
- ☐ Conjunctivitis
- ☐ Acute angle closure glaucoma
- ☐ Anterior uveitis
- ☐ Subconjunctival haemorrhage

Scleritis

18%

Conjunctivitis

5%

Acute angle closure glaucoma

52%

Anterior uveitis

21%

Subconjunctival haemorrhage

4%

Red eye - glaucoma or uveitis?

- glaucoma: severe pain, haloes, 'semi-dilated' pupil
- uveitis: small, fixed oval pupil, ciliary flush

Important for me Less important

A 67-year-old man who is known to have raised intraocular pressure is prescribed dorzolamide eye drops. What is the mechanism of action of this drug?

- ☐ Prostaglandin analogue
- ☐ Alpha2-adrenoceptor agonist
- ☐ Carbonic anhydrase inhibitor
- ☐ Muscarinic receptor agonist
- ☐ Beta-blocker

Prostaglandin analogue

11%

Alpha2-adrenoceptor agonist

7%

Carbonic anhydrase inhibitor

69%

Muscarinic receptor agonist

8%

Beta-blocker

5%

A 39-year-old woman with a history of rheumatoid arthritis presents with a two day history of a red right eye. There is no itch or pain. Pupils are 3mm, equal and reactive to light. Visual acuity is 6/5 in both eyes. What is the most likely diagnosis?

☐ Keratoconjunctivitis sicca

☐ Scleritis

☐ Glaucoma

☐ Episcleritis

☐ Anterior uveitis

Keratoconjunctivitis sicca

19%

Scleritis

13%

Glaucoma

3%

Episcleritis

56%

Anterior uveitis

9%

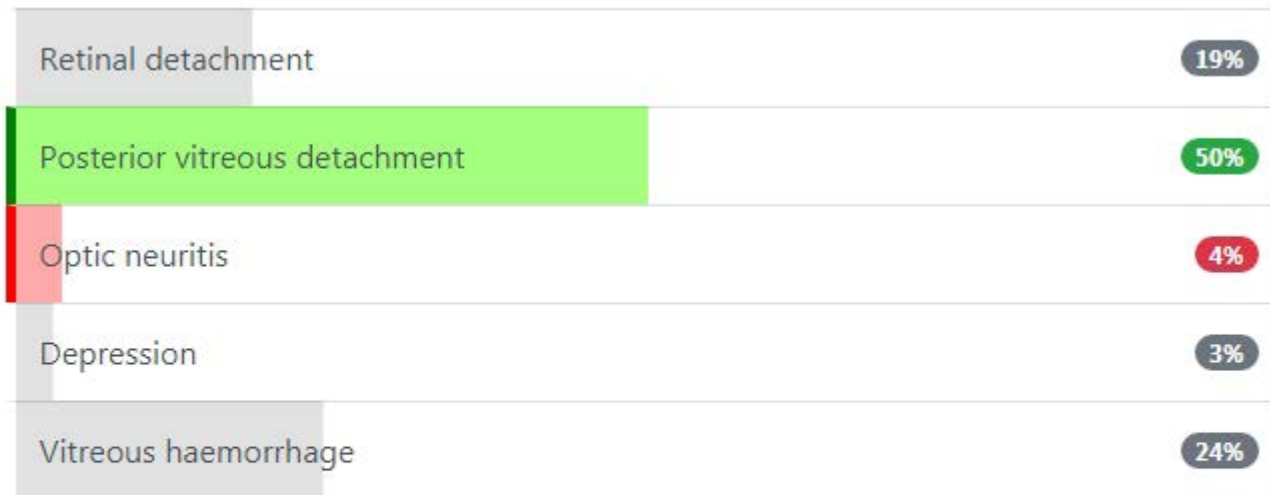
Scleritis is painful, episcleritis is not painful

Important for me

Less important

An 80-year-old woman presents with 'funny spots' affecting her vision. Over the past week she has noticed a number of flashes and floaters in the visual field of the right eye. What is the most likely diagnosis?

- ☐ Retinal detachment
- ☐ Posterior vitreous detachment
- ☐ Optic neuritis
- ☐ Depression
- ☐ Vitreous haemorrhage



Posterior vitreous detachment is thought to occur in up to 50-75% of the population over 65 years and is the most likely diagnosis here. Such patients are normally reviewed by an ophthalmologist to assess the risk of progressing to retinal detachment.

Which one of the following is the most common ocular manifestation of rheumatoid arthritis?

- ☐ Scleritis
- ☐ Episcleritis
- ☐ Keratoconjunctivitis sicca
- ☐ Corneal ulceration
- ☐ Keratitis



Keratoconjunctivitis sicca is characterised by dry, burning and gritty eyes caused by decreased tear production

A 15-year-old boy presents to the GP surgery with some skin changes of the neck. The mother reports that she first noticed a small area of skin changes 3 months ago. Initially, she didn't think too much about it but recently noticed that it has been getting bigger and more obvious, now involving the skin covering almost half of the right side of the neck. On examination, there is a large area of Small, yellow papules of 1-5 mm in diameter in a reticular pattern and coalescing at places into plaques. The skin has a 'plucked-chicken' appearance. The boy reports no problem with his vision.

What would you be the likely finding on fundoscopy?

☐ Angioid retinal streaks

☐ Lisch nodules

☐ Cotton wool spots

☐ Neovascularisation

☐ Bone spicules

Angioid retinal streaks

48%

Lisch nodules

28%

Cotton wool spots

6%

Neovascularisation

5%

Bone spicules

12%

Angioid retinal streaks are a feature of pseudoxanthoma elasticum

Important for me Less important

Angioid streaks are small breaks in Bruch's membrane, an elastic tissue containing membrane of the retina. It is a feature of pseudoxanthoma elasticum. The earliest sign in pseudoxanthoma elasticum is the skin changes. This patient likely has pseudoxanthoma elasticum.

Lisch nodules are features of neurofibromatosis.

Cotton wool spots and neovascularisation are both features of diabetic retinopathy.

Bone spicules are seen in retinitis pigmentosa.

Dr Assem

A 54-year-old woman presents with a persistent watery left eye for the past 4 days. On examination there is erythema and swelling of the inner canthus of the left eye. What is the most likely diagnosis?

- ☐ Blepharitis
- ☐ Acute angle closure glaucoma
- ☐ Meibomian cyst
- ☐ Dacryocystitis
- ☐ Pinguecula

Blepharitis

16%

Acute angle closure glaucoma

4%

Meibomian cyst

16%

Dacryocystitis

59%

Pinguecula

5%

A 53-year-old male who presents to the emergency department with a painful red eye. He has vomited once since the pain started. He reports seeing haloes around lights.

His immediate management includes latanoprost and pilocarpine, and he requires an urgent ophthalmology referral.

What is the mode of the action of pilocarpine?

- ☐ Muscarinic receptor agonist
- ☐ Muscarinic receptor antagonist
- ☐ Nicotinic receptor agonist
- ☐ Nicotinic receptor antagonist
- ☐ Adrenergic receptor agonist

Muscarinic receptor agonist

47%

Muscarinic receptor antagonist

33%

Nicotinic receptor agonist

6%

Nicotinic receptor antagonist

6%

Adrenergic receptor agonist

8%

Pilocarpine is a muscarinic receptor agonist

Important for me Less important

Pilocarpine is a muscarinic receptor agonist - it increases uveoscleral outflow by constricting the pupil.

Examples of muscarinic receptor antagonists include atropine and hyoscine (scopolamine) - these are not used in the management of glaucoma.

Nicotinic receptor agonists include nicotine and acetylcholine, therefore this answer is incorrect.

Nicotinic receptor antagonists include succinylcholine, atracurium, vecuronium and bupropion.

Adrenergic receptor agonists include norepinephrine and epinephrine.

Dr Assem

A 72-year-old woman presents with a vesicular rash around her left eye. The left eye is red and there is a degree of photophobia. A presumptive diagnosis of herpes zoster ophthalmicus is made and an urgent referral to ophthalmology is made.

What treatment is she most likely to be given?

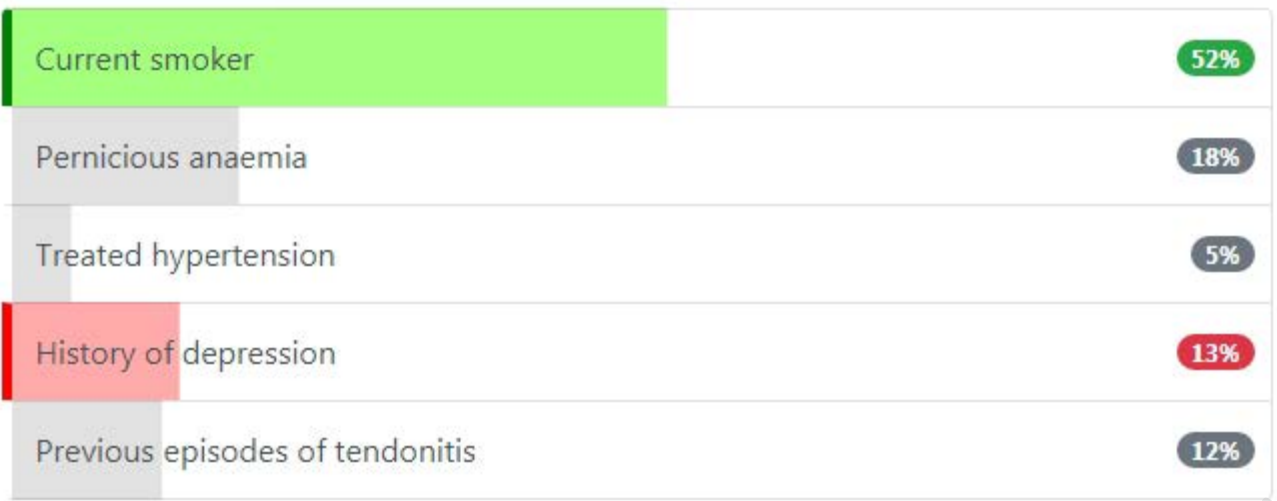
- ☐ Topical aciclovir + topical chloramphenicol
- ☐ Topical aciclovir + topical corticosteroids
- ☐ Oral prednisolone + topical aciclovir
- ☐ Topical aciclovir
- ☐ Oral aciclovir



There is no role for topical antivirals if systemic therapy is given. Topical corticosteroids are sometimes given to treat secondary inflammation.

A 71-year-old man who has recently been diagnosed with macular degeneration asks for advice regarding antioxidant dietary supplements. Which one of the following may contraindicate the prescription of such supplements?

- ☐ Current smoker
- ☐ Pernicious anaemia
- ☐ Treated hypertension
- ☐ History of depression
- ☐ Previous episodes of tendonitis



Condition	Percentage
Current smoker	52%
Pernicious anaemia	18%
Treated hypertension	5%
History of depression	13%
Previous episodes of tendonitis	12%

Current smoker

52%

Pernicious anaemia

18%

Treated hypertension

5%

History of depression

13%

Previous episodes of tendonitis

12%

Beta-carotene has been found to increase the risk of lung cancer and hence antioxidant dietary supplements are not recommended for smokers.

A 47-year-old female with a history of rheumatoid arthritis presents with a painful and red left eye. Visual acuity is normal. Fundoscopy is also unremarkable. What is the most likely diagnosis?

- ☐ Scleritis
- ☐ Episcleritis
- ☐ Glaucoma
- ☐ Anterior uveitis
- ☐ Keratoconjunctivitis sicca

Scleritis	55%
Episcleritis	16%
Glaucoma	4%
Anterior uveitis	11%
Keratoconjunctivitis sicca	15%

Scleritis is painful, episcleritis is not painful

Important for me Less important

A key way to discriminate between scleritis and episcleritis is the presence of pain. Keratoconjunctivitis sicca is usually bilateral and associated more with dryness, burning and itch

A 24-year-old man presents to the emergency department complaining of left eye pain. He has not been able to wear his contact lenses for the past 24 hours due to the pain. He describes the pain as severe and wonders whether he has 'got something stuck in his eye'. On examination there is diffuse hyperaemia of the left eye. The left cornea appears hazy and pupillary reaction is normal. Visual acuity is reduced on the left side and a degree of photophobia is noted. A hypopyon is also seen. What is the most likely diagnosis?

- ☐ Acute angle closure glaucoma
- ☐ Viral conjunctivitis
- ☐ Keratitis
- ☐ Episcleritis
- ☐ Anterior uveitis

Acute angle closure glaucoma

11%

Viral conjunctivitis

6%

Keratitis

41%

Episcleritis

8%

Anterior uveitis

34%

Whilst a hypopyon can of course be seen in anterior uveitis the combination of a normal pupillary reaction and contact lens use make a diagnosis of keratitis more likely.

A 71-year-old female with dry age-related macular degeneration is reviewed. Unfortunately her eyesight has deteriorated over the past six months. She has never smoked and is taking antioxidant supplements. What is the most appropriate next step?

- ☐ Retinal transplant
- ☐ Intravitreal ranibizumab
- ☐ Explain no other medical therapies currently available
- ☐ Photodynamic therapy
- ☐ Photocoagulation

Retinal transplant

6%

Intravitreal ranibizumab

22%

Explain no other medical therapies currently available

45%

Photodynamic therapy

13%

Photocoagulation

15%

Which one of the following is least recognised as a cause of tunnel vision?

- ☐ Papilloedema
- ☐ Choroidoretinitis
- ☐ Angioid retinal streaks
- ☐ Glaucoma
- ☐ Retinitis pigmentosa

Papilloedema

27%

Choroidoretinitis

10%

Angioid retinal streaks

39%

Glaucoma

14%

Retinitis pigmentosa

10%

Dr. S. S. S. S.

Which one of the following causes of Horner's syndrome is due to a central lesion?

- ☐ Cavernous sinus thrombosis
- ☐ Internal carotid aneurysm
- ☐ Syringomyelia
- ☐ Pancoast's tumour
- ☐ Cervical rib

Cavernous sinus thrombosis

18%

Internal carotid aneurysm

10%

Syringomyelia

61%

Pancoast's tumour

8%

Cervical rib

3%

Horner's syndrome - anhydrosis determines site of lesion:

- head, arm, trunk = central lesion: stroke, syringomyelia
- just face = pre-ganglionic lesion: Pancoast's, cervical rib
- absent = post-ganglionic lesion: carotid artery

Important for me Less important

A 24-year-old man who has a family history of retinitis pigmentosa is reviewed in the ophthalmology clinic. He reports worsening vision over the past few months. During fundoscopy, which of the following findings with most support a diagnosis of retinitis pigmentosa?

- ☐ Pigmented scrambled egg appearance concentrated around the macula
- ☐ Central irregular pigmentation with bull's eye maculopathy
- ☐ Black bone spicule-shaped pigmentation in the peripheral retina
- ☐ Drusen with haemorrhagic atrophic changes concentrated at the periphery of the retina
- ☐ Pigmented choroidal neovascularisation throughout the retina

Pigmented scrambled egg appearance concentrated around the macula

8%

Central irregular pigmentation with bull's eye maculopathy

6%

Black bone spicule-shaped pigmentation in the peripheral retina

66%

Drusen with haemorrhagic atrophic changes concentrated at the periphery of the retina

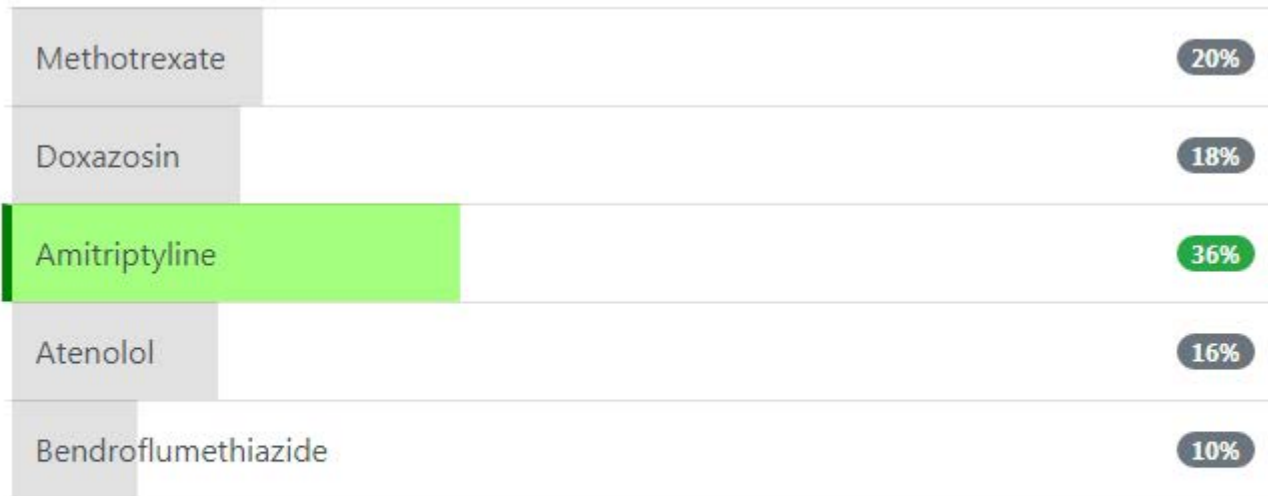
7%

Pigmented choroidal neovascularisation throughout the retina

12%

A 65-year-old woman presents to the Emergency Department with visual problems. She has rheumatoid arthritis, depression and takes medication to control her blood pressure. Over the past few days she has been getting troublesome headaches and blurred vision but today has noted a marked reduction in vision in the right eye. On examination her right eye is red, has a sluggish pupil and a corrected visual acuity 6/30. Her medication has recently been changed. Which one of the following drugs is most likely to have precipitated this event?

- ☐ Methotrexate
- ☐ Doxazosin
- ☐ Amitriptyline
- ☐ Atenolol
- ☐ Bendroflumethiazide



Drugs which may precipitate acute glaucoma include anticholinergics and tricyclic antidepressants

A 64-year-old woman with type 2 diabetes mellitus presents as she has started to bump into things since the morning. Over the previous two days she had noticed some 'floating spots in her eyes'. Examination reveals she has no vision in her right eye. The red reflex on the right side is difficult to elicit and you are unable to visualise the retina on the right side during fundoscopy. Examination of the left fundus reveals changes consistent with pre-proliferative diabetic retinopathy. What is the most likely diagnosis?

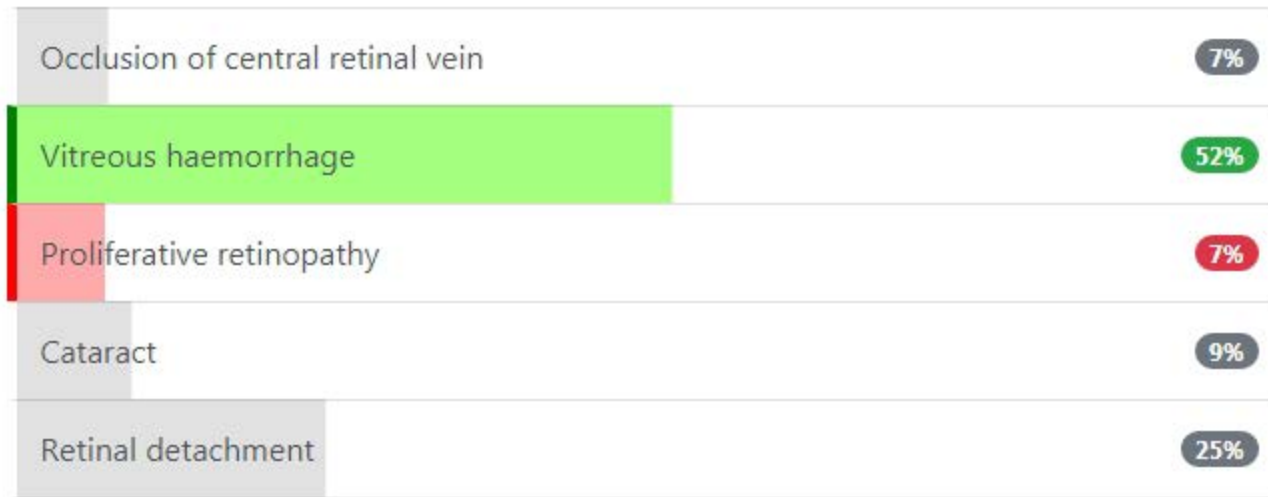
☐ Occlusion of central retinal vein

☐ Vitreous haemorrhage

☐ Proliferative retinopathy

☐ Cataract

☐ Retinal detachment



The history of diabetes, complete loss of vision in the affected eye and inability to visualise the retina point towards a diagnosis of vitreous haemorrhage. Please see the table below for help in differentiating retinal detachment from vitreous haemorrhage.

Each one of the following predisposes to cataract formation, except:

- ☐ Down's syndrome
- ☐ Hypercalcaemia
- ☐ Diabetes mellitus
- ☐ Long-term steroid use
- ☐ Uveitis

Down's syndrome

11%

Hypercalcaemia

45%

Diabetes mellitus

6%

Long-term steroid use

5%

Uveitis

32%

Hypocalcaemia is a cause of cataracts

Important for me Less important

An 80-year-old male presents to the Neurology clinic with double vision and unsteadiness whilst walking. He has a past medical history of hypertension, hypercholesterolaemia and type 2 diabetes.

On examination, you notice a right partial ptosis and miosis. The patient also has notable right facial loss of pain and temperature sensation with left sided truncal sensory loss contralateral to the face.

In the clinic, apraclonidine eye drops are added to the affected eye, which causes a dilatation, whilst in the opposite eye, a pupil constriction occurs. After the eye drops have been eliminated from the body, 1% hydroxyamphetamine eye drops are then instilled. One hour after instillation, both pupils dilate.

What neurone order is likely affected in the sympathetic pathway?

- ☐ First order
- ☐ Second order
- ☐ Third order
- ☐ Fourth order
- ☐ Fifth order

First order	37%
Second order	26%
Third order	26%
Fourth order	8%
Fifth order	3%

The answer is the first order neurone.

Apraclonidine eye drops are initially used to confirm a Horner's pupil. Apraclonidine stimulates both alpha-1 and alpha-2 receptors. When added to the affected eye, it causes pupil dilation by $>2\text{mm}$ because of the relative supersensitivity of this pupil to alpha-1 receptor activity. In a normal pupil, however, it causes constriction due to the more potent activity at the alpha-2 receptor which triggers reuptake of noradrenaline in the synaptic cleft.

Hydroxyamphetamine is then used to distinguish between first/second or third order neurones. In other words, it will distinguish either a lesion in the brainstem, cervical cord, chest or neck and one affecting above the superior cervical ganglion at the carotid bifurcation. In a normal pupil or a first/second order Horner's, the pupil will dilate secondary to increased levels of noradrenaline released from the post-synaptic neurones. In a third order neurone, this will not occur.

There is no fourth or fifth order neurone.

A 25-year-old woman presents with a one-day history of a painful and red left eye. She describes how her eye is continually streaming tears. On examination she exhibits a degree of photophobia in the affected eye and application of fluorescein demonstrates a dendritic pattern of staining. Visual acuity is 6/6 in both eyes. What is the most appropriate management?

- ☐ Topical steroid
- ☐ Perform a lumbar puncture
- ☐ Treat with subcutaneous sumatriptan
- ☐ Topical aciclovir
- ☐ Topical chloramphenicol

Topical steroid

15%

Perform a lumbar puncture

4%

Treat with subcutaneous sumatriptan

7%

Topical aciclovir

58%

Topical chloramphenicol

15%

This patient has a dendritic corneal ulcer. Topical aciclovir and ophthalmology review is required. Giving a topical steroid in this situation could be disastrous as it may worsen the infection.

Which one of the following is not a risk factor for primary open-angle glaucoma?

- ☐ Diabetes mellitus
- ☐ Family history
- ☐ Hypertension
- ☐ Afro-Caribbean ethnicity
- ☐ Hypermetropia

Diabetes mellitus

9%

Family history

6%

Hypertension

10%

Afro-Caribbean ethnicity

22%

Hypermetropia

53%

Acute angle closure glaucoma is associated with hypermetropia, where as primary open-angle glaucoma is associated with myopia

Important for me Less important

A 34-year-old woman presents complaining of headaches. Examination of her pupils using a light shone alternately in each eye reveals that when the light is shone in the right eye both pupils constrict but when the light source immediately moves to the left eye both eyes appear to dilate.

What is the most likely diagnosis?

- ☐ Right optic neuritis
- ☐ Left sided Horner's syndrome
- ☐ Craniopharyngioma
- ☐ Left optic neuritis
- ☐ Right Holmes-Adie pupil

Right optic neuritis	7%
Left sided Horner's syndrome	9%
Craniopharyngioma	6%
Left optic neuritis	49%
Right Holmes-Adie pupil	28%

This is the 'swinging light test' and reveals a relative afferent pupillary defect. As there is a defect in the afferent nerve on the left side the pupils constrict less than normal, giving the impression of dilation.

Given her age, multiple sclerosis causing optic neuritis is the likely underlying diagnosis. Optic neuritis typically causes a dull ache in the region of the eye which is aggravated by movement

Which one of the following statements regarding the Holmes-Adie pupil is **incorrect**?

- ☐ May be associated with absent ankle/knee reflexes
- ☐ Bilateral in 80% of cases
- ☐ It is a benign condition
- ☐ Slowly reactive to accommodation but very poorly (if at all) to light
- ☐ Causes a dilated pupil

May be associated with absent ankle/knee reflexes

8%

Bilateral in 80% of cases

51%

It is a benign condition

11%

Slowly reactive to accommodation but very poorly (if at all) to light

17%

Causes a dilated pupil

13%

The Holmes-Adie pupil is unilateral, rather than bilateral, in 80% of patients

A 71-year-old man presents with severe pain around his right eye and vomiting. On examination the right eye is red and decreased visual acuity is noted. Which one of the following options is the most appropriate initial treatment?

- ☐ Topical pilocarpine + oral prednisolone
- ☐ Topical pilocarpine + topical steroids
- ☐ Topical steroids
- ☐ Topical pilocarpine + intravenous acetazolamide
- ☐ Topical steroids + intravenous acetazolamide

Topical pilocarpine + oral prednisolone

15%

Topical pilocarpine + topical steroids

10%

Topical steroids

6%

Topical pilocarpine + intravenous acetazolamide

60%

Topical steroids + intravenous acetazolamide

9%

Treatment of acute glaucoma - acetazolamide + pilocarpine

Important for me Less important

Which one of the following best describes the action of latanoprost in the management of primary open-angle glaucoma?

- ☐ Carbonic anhydrase inhibitor
- ☐ Reduces aqueous production + increases outflow
- ☐ Opens up drainage pores
- ☐ Increases uveoscleral outflow
- ☐ Reduces aqueous production

Carbonic anhydrase inhibitor

10%

Reduces aqueous production + increases outflow

24%

Opens up drainage pores

5%

Increases uveoscleral outflow

51%

Reduces aqueous production

11%

A 65-year-old man with a 16 year history of type 2 diabetes mellitus presents complaining of poor eye sight and blurred vision. Visual acuity measured using a Snellen chart is reduced to 6/12 in the right eye and 6/18 in the left eye. Fundoscopy reveals a number of yellow deposits in the left eye consistent with drusen formation. Similar changes but to a lesser extent are seen in the right eye. What is the most likely diagnosis?

- ☐ Wet age-related macular degeneration
- ☐ Pre-proliferative diabetic retinopathy
- ☐ Chronic open angle glaucoma
- ☐ Proliferative diabetic retinopathy
- ☐ Dry age-related macular degeneration

Wet age-related macular degeneration

12%

Pre-proliferative diabetic retinopathy

11%

Chronic open angle glaucoma

4%

Proliferative diabetic retinopathy

9%

Dry age-related macular degeneration

64%

Drusen = **D**ry macular degeneration

Important for me Less important

A 49-year-old male patient presents with acute onset loss of vision in the right eye preceded by a 2-hour history of progressively enlarging dark spots in his vision. He has type-1 diabetes mellitus for over 15 years and has been poorly controlled.

What is the most likely diagnosis

- ☐ Ocular migraine
- ☐ Retinal detachment
- ☐ Vitreous haemorrhage
- ☐ Ischaemic optic neuropathy
- ☐ Retinal artery occlusion

Ocular migraine	3%
Retinal detachment	20%
Vitreous haemorrhage	57%
Ischaemic optic neuropathy	9%
Retinal artery occlusion	10%

Vitreous haemorrhage is a cause of sudden painless loss of vision in the context of diabetic retinopathy

Important for me [Less important](#)

Vitreous haemorrhage is a cause of sudden painless loss of vision in the context of diabetic retinopathy. It usually presents with dark spots (scotoma) in the vision initially. This man is likely to have diabetic retinopathy.

Ocular migraine does not usually cause visual loss.

Retinal detachment usually presents with dense shadow over vision progressing centrally.

Even though this man has ischaemic risk factors, ischaemic optic neuropathy does not usually present with dark spots.

Retinal artery occlusion does not usually present with dark spots.

A 71-year-old with a history of type 2 diabetes mellitus and hypertension presents due to the sensation of light flashes in his right eye. These symptoms have been present for the past 2 days and seem to occur more at the peripheral part of vision. There is no redness or pain in the affected eye. Corrected visual acuity is measured as 6/9 in both eyes. What is the most likely diagnosis?

- ☐ Change in shape of eye secondary to variations in blood sugar
- ☐ Primary open angle glaucoma
- ☐ Vitreous detachment
- ☐ Normal phenomenon in diabetic retinopathy
- ☐ Normal phenomenon in healthy eyes

Change in shape of eye secondary to variations in blood sugar

4%

Primary open angle glaucoma

9%

Vitreous detachment

75%

Normal phenomenon in diabetic retinopathy

8%

Normal phenomenon in healthy eyes

4%

Flashes and floaters - vitreous/retinal detachment

Important for me Less important

Flashes and floaters are symptoms of vitreous detachment. The patient is at risk of retinal detachment and should be referred urgently to an ophthalmologist

Which one of the following is least associated with the development of optic atrophy?

☐ Tobacco

☐ Methanol

☐ Vitamin B12 deficiency

☐ Lead

☐ Zinc deficiency



A 54-year-old man with type 2 diabetes mellitus is found on annual review to have new vessel formation at the optic disc. Visual acuity in both eyes is not affected (6/9). Blood pressure is 155/84 mmHg.

HbA1c	68 mmol/mol (8.4%)
-------	--------------------

What is the most important intervention in this patient?

- ☐ Follow-up ophthalmoscopy in 3 months
- ☐ Add aspirin
- ☐ Blood pressure control
- ☐ Tight glycaemic control
- ☐ Laser therapy



A horizontal bar chart with five rows. Each row has a colored bar on the left and a percentage value in a rounded rectangle on the right. The bars are ordered from top to bottom: red (6%), grey (4%), light grey (13%), medium grey (35%), and green (42%). The green bar is the longest, followed by the medium grey bar, the light grey bar, the grey bar, and the red bar is the shortest.

Management Option	Percentage
Follow-up ophthalmoscopy in 3 months	6%
Add aspirin	4%
Blood pressure control	13%
Tight glycaemic control	35%
Laser therapy	42%

Follow-up ophthalmoscopy in 3 months

6%

Add aspirin

4%

Blood pressure control

13%

Tight glycaemic control

35%

Laser therapy

42%

This patient has proliferative diabetic retinopathy and urgent referral to an ophthalmologist for panretinal photocoagulation is indicated

Dr Assem

A 70-year-old man is investigated for blurred vision. Fundoscopy reveals drusen, retinal epithelial and macular neovascularisation. A diagnosis of age related macular degeneration is suspected. What is the most appropriate next investigation?

- ☐ Vitreous fluid sampling
- ☐ MRI orbits
- ☐ Ocular tonometry
- ☐ Fluorescein angiography
- ☐ Kinetic perimetry

Vitreous fluid sampling

7%

MRI orbits

7%

Ocular tonometry

18%

Fluorescein angiography

61%

Kinetic perimetry

8%

An 83-year-old female presented to her GP with complete loss of vision in her right eye which occurred suddenly. The episode lasted for 10 minutes and she denies any pain in her eye. Her past medical history includes hypercholesterolaemia, diet controlled, and hypertension for which she takes amlodipine.

Eye examination and fundoscopy are normal. Her blood pressure is 145/80 mmHg.

What medication are you going to give first?

- ☐ Aspirin 300mg
- ☐ Aspirin 75mg
- ☐ Simvastatin 20mg
- ☐ Apixaban 5mg BD
- ☐ Enoxaparin 40mg

Aspirin 300mg	65%
Aspirin 75mg	12%
Simvastatin 20mg	9%
Apixaban 5mg BD	6%
Enoxaparin 40mg	8%

Monocular transient painless loss of vision (amaurosis fugax) should be treated as a TIA

Important for me [Less important](#)

Sudden painless loss of vision with a normal fundoscopy examination is an amaurosis fugax and thus treated as a transient ischaemic attack (TIA). NICE guidance states that 300mg of aspirin should be given immediately and admission if ABCD2 score >3 or crescendo TIA, otherwise an immediate TIA clinic referral is required.

Option 2 is the correct medication but incorrect dose.

Option 3 is likely to be added later but aspirin is the first initial plan.

Apixaban is usually given for cardiovascular disease and enoxaparin 40mg is the dose given for deep vein thrombosis prophylaxis with normal renal function.

A 78-year-old gentleman presents to the emergency department complaining of a severe headache. His only medical condition is hypertension, for which he takes Ramipril 10 mg and Amlodipine 10 mg. As part of the full work up fundoscopy is performed, with the following results bilaterally: Scattered cotton wool spots, tortuous vessels throughout, and AV nipping.

What stage of hypertensive retinopathy according to the Keith-Wagener classification does this patient have?

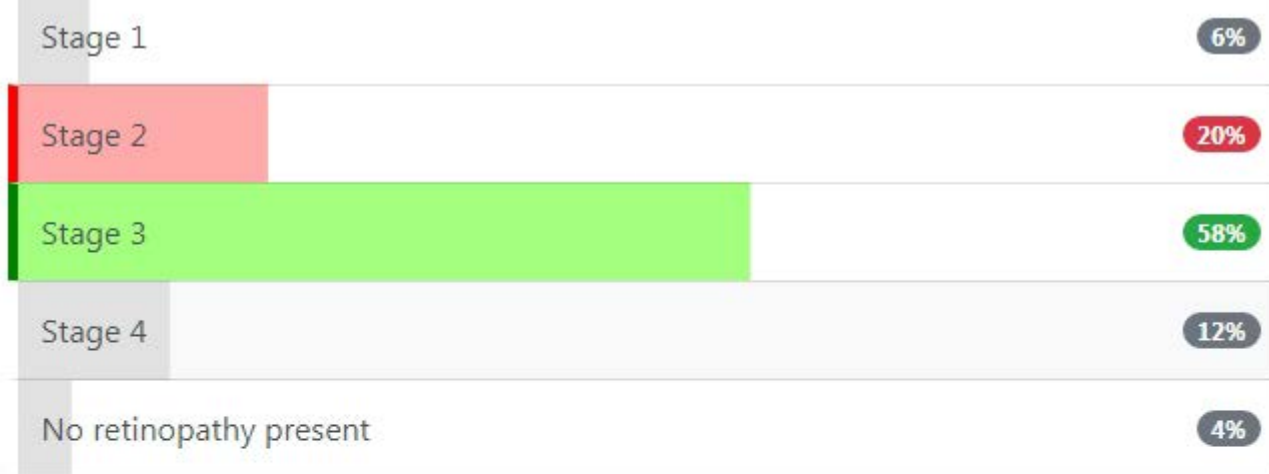
☐ Stage 1

☐ Stage 2

☐ Stage 3

☐ Stage 4

☐ No retinopathy present



Fundoscopy reveals end organ damage in hypertension

Important for me Less important

This describes stage 3 hypertensive retinopathy, as there are features of stages 1 to 3 described.

Hypertensive and diabetic retinopathy are both common finals questions.

Dr Assem

A 67-year-old man presents as he has developed a painful blistering rash around his right eye. On examination a vesicular rash covering the right trigeminal nerve dermatome is seen. Currently he has no eye symptoms or signs. Which one of the following is most likely to predict future eye involvement?

- ☐ Presence of the rash on the tip of his nose
- ☐ Smoking history
- ☐ Increasing age
- ☐ Previous courses of corticosteroids
- ☐ Presence of the rash in the ear canal

Presence of the rash on the tip of his nose

70%

Smoking history

6%

Increasing age

5%

Previous courses of corticosteroids

8%

Presence of the rash in the ear canal

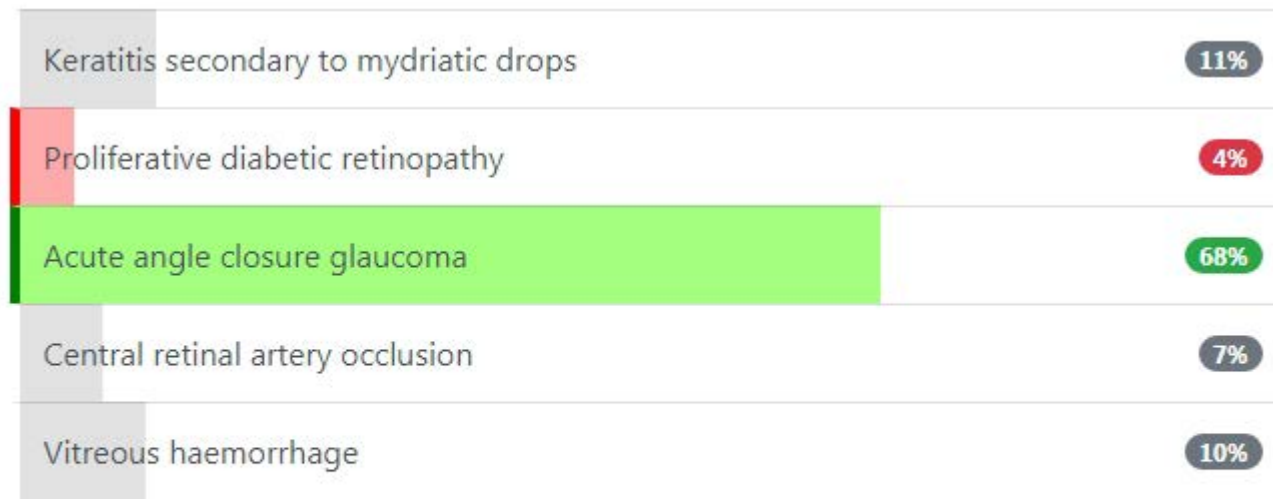
12%

This is Hutchinson's sign which is strongly predictive for ocular involvement.

Dr. Assem

A 68-year-old man with a history of type 2 diabetes mellitus presents with worsening eye sight. Mydriatic drops are applied and fundoscopy reveals pre-proliferative diabetic retinopathy. A referral to ophthalmology is made. Later in the evening whilst driving home he develops pain in his left eye associated with decreased visual acuity. What is the most likely diagnosis?

- ☐ Keratitis secondary to mydriatic drops
- ☐ Proliferative diabetic retinopathy
- ☐ Acute angle closure glaucoma
- ☐ Central retinal artery occlusion
- ☐ Vitreous haemorrhage



Mydriatic drops are a known precipitant of acute angle closure glaucoma. This scenario is more common in exams than clinical practice.

Which one of the following features is not characteristic of optic neuritis?

- ☐ Eye pain worse on movement
- ☐ Relative afferent pupillary defect
- ☐ Poor discrimination of colours, 'red desaturation'
- ☐ Sudden onset of visual loss
- ☐ Central scotoma

Eye pain worse on movement	12%
Relative afferent pupillary defect	9%
Poor discrimination of colours, 'red desaturation'	12%
Sudden onset of visual loss	47%
Central scotoma	19%

Visual loss typically occurs over days rather than hours. Sudden visual loss due to optic neuritis is very unusual.

A 64-year-old woman presents with bilateral sore eyelids. She also complains of her eyes being dry all the time. On examination her eyelid margins are erythematous at the margins but are not swollen. Of the given options, what is the most appropriate initial management?

- ☐ Topical chloramphenicol + mechanical removal of lid debris
- ☐ Hot compresses + topical steroids
- ☐ Topical chloramphenicol + topical steroids
- ☐ Hot compresses + mechanical removal of lid debris
- ☐ Topical chloramphenicol + hot compresses

Topical chloramphenicol + mechanical removal of lid debris	9%
Hot compresses + topical steroids	12%
Topical chloramphenicol + topical steroids	8%
Hot compresses + mechanical removal of lid debris	56%
Topical chloramphenicol + hot compresses	15%

Artificial tears may also be given for symptom relief of blepharitis

Which one of the following is associated with the Holmes-Adie pupil?

- ☐ Decreased ankle reflexes
- ☐ Pupillary constriction
- ☐ Ptosis in 10-20% of cases
- ☐ An increased of developing multiple sclerosis
- ☐ Neurosyphilis

Decreased ankle reflexes

56%

Pupillary constriction

12%

Ptosis in 10-20% of cases

8%

An increased of developing multiple sclerosis

7%

Neurosyphilis

18%

Holmes ADIe = DIlated pupil, females, absent leg reflexes

Important for me Less important

Rachel is a 45-year-old who has routine bloods for a health check. Blood tests show the following:

Na ⁺	125 mmol/l
K ⁺	4.3 mmol/l
Urea	5.3 mmol/l
Creatinine	60 µmol/l

She takes the following medications: sertraline, carbimazole, amlodipine, metformin, aspirin. Which of her medications is likely to be the cause of her hyponatraemia?

- ☐ Aspirin
- ☐ Metformin
- ☐ Amlodipine
- ☐ Carbimazole
- ☐ Sertraline



SSRIs are associated with hyponatraemia

Important for me Less important

Out of the list above sertraline is the medication known to cause hyponatraemia.

Other common drug causes of low sodium include: chlorpropamide, carbamazepine, selective serotonin reuptake inhibitor (SSRI) antidepressants, tricyclic antidepressants, lithium, MDMA/ecstasy, tramadol, haloperidol, vincristine, desmopressin, fluphenazine.

Which one of the following interventions is most likely to be beneficial in a patient with schizophrenia?

- ☐ Counselling
- ☐ Supportive psychotherapy
- ☐ Social skills training
- ☐ Adherence therapy
- ☐ Cognitive behavioural therapy

Counselling

5%

Supportive psychotherapy

25%

Social skills training

11%

Adherence therapy

17%

Cognitive behavioural therapy

42%

A 32-year-old woman is brought to the Emergency department by the police. She was found preaching outside the local supermarket, telling people that she is god's disciple and has been sent to prevent them from wasting money. It transpires that she has also spent up to her limit on her bank card. She began treatment with fluoxetine some 3 weeks ago for reactive depression after splitting from her husband. A limited physical examination due to poor compliance is unremarkable, as is a routine blood screen.

Which of the following is the most likely diagnosis?

- ☐ Psychotic depression
- ☐ Munchausen's syndrome
- ☐ Schizophrenia
- ☐ Viral encephalitis
- ☐ Mania



Key features here include clear evidence of delusions of grandeur, coupled with starting treatment for fluoxetine some 3 weeks ago. Taken together these factors suggest possible mania. It is most likely to be related to selective serotonin reuptake inhibitor prescription for her depression.

Psychotic depression is unlikely given there are no delusions related to illness, loss of self-worth or other features usually expected. Schizophrenia is also unlikely given the absence of features such as auditory hallucinations or delusions of reference. Rather than being associated with agitation and hyperactivity, drowsiness and memory loss are more common features of viral encephalitis. The proximity to fluoxetine prescription, and the fact features of her illness fit so well with mania, make Munchausen's syndrome unlikely.

A 24-year-old female is reviewed following a course of cognitive behaviour therapy for bulimia. She feels there has been no improvement in her condition and is interested in trying pharmacological treatments. Which one of the following is most suitable?

- ☐ Low-dose citalopram
- ☐ Low-dose fluoxetine
- ☐ Low-dose amitriptyline
- ☐ High-dose amitriptyline
- ☐ High-dose fluoxetine

Low-dose citalopram

14%

Low-dose fluoxetine

38%

Low-dose amitriptyline

13%

High-dose amitriptyline

5%

High-dose fluoxetine

31%

A 23-year-old man asks to be referred to a plastic surgeon. From his records you can see he has been treated for anxiety and depression with fluoxetine previously and has been off work with back pain for the past three months. He is concerned that his ears are too big in proportion to his face. He reports that he now seldom leaves the house because of this. On examination his ears appear to be within normal limits. What is the most appropriate description of this behaviour?

- ☐ Hypochondriasis
- ☐ Generalised anxiety disorder
- ☐ Somatisation
- ☐ Malingering
- ☐ Dysmorphophobia

Hypochondriasis

7%

Generalised anxiety disorder

4%

Somatisation

8%

Malingering

5%

Dysmorphophobia

76%

A 34-year-old male comes to clinic for an asthma review. He tells you he has recently been diagnosed with a personality disorder. The diagnosis came about after he was referred by his boss to occupational health for being overly sensitive and getting angry when colleagues told him how to do his job. He feels his diagnosis is unjustified and is all a set up as his boss, who used to be a good friend, knows he is better at his job than him.

What diagnosis is he most likely to have received?

- ☐ Schizoid personality disorder
- ☐ Narcissistic personality disorder
- ☐ Paranoid personality disorder
- ☐ Borderline personality disorder
- ☐ Avoidant personality disorder

Schizoid personality disorder

10%

Narcissistic personality disorder

33%

Paranoid personality disorder

38%

Borderline personality disorder

13%

Avoidant personality disorder

6%

Paranoid personality disorder may be diagnosed in patients who are overly sensitive and can be unforgiving if insulted, question loyalty of those around them and are reluctant to confide in others

Important for me Less important

The correct answer is paranoid personality disorder. Patients with paranoid personality disorder are over sensitive, unforgiving and perceive feedback as attacks on their character. They can be preoccupied with conspiracy theories and tend to question the loyalty of others. Based on the patients' description, this is the most likely diagnosis.

Option 2 is incorrect. Patients with schizoid personality disorder tend to have a lack of interest in sexual interactions are cold and lack close friendships preferring to spend time alone. They are also indifferent to praise making this unlikely to be the correct answer.

Narcissistic personality disorder is not the correct answer. These patients have a heightened impression of self-importance and entitlement often believing they have unlimited abilities to succeed, become powerful or look beautiful. Additionally, they lack empathy and will happily take advantage of others to achieve their own need.

Borderline personality disorder is also incorrect. This is characterised by emotional instability, impulsive behaviour, feelings of emptiness and recurrent attempts at self-harm. Patients often fear abandonment as opposed to the questioning loyalty of those around them.

Patients with avoidant personality disorder tend to avoid social contact/relationships due to fear of being criticised, rejected or embarrassed as opposed to being unforgiving, making this less likely the correct answer.

Further information on personality disorder can be found in the ICD 10 guide - <http://apps.who.int/classifications/icd10/browse/2016/en#/F66>

The risk of developing schizophrenia if one monozygotic twin is affected is approximately:

☐ 10%

☐ 20%

☐ 50%

☐ 75%

☐ >95%

10%

8%

20%

13%

50%

62%

75%

9%

>95%

8%

A 65-year-old female with a history of ischaemic heart disease is noted to be depressed following a recent myocardial infarction. What would be the most appropriate antidepressant to start?

- ☐ Paroxetine
- ☐ Imipramine
- ☐ Flupentixol
- ☐ Venlafaxine
- ☐ Sertraline



Sertraline is the SSRI of choice post myocardial infarction

Important for me Less important

Sertraline is the preferred antidepressant following a myocardial infarction as there is more evidence for its safe use in this situation than other antidepressants

Dr Assem

Which one of the following statements regarding post-partum mental health problems is NOT true?

- ☐ Post-natal depression is seen in around 2-3% of women
- ☐ Puerperal psychosis has a recurrence rate of around 20%
- ☐ Baby-blues are seen in the majority of women
- ☐ Post-natal depression usually develops within the first month
- ☐ Sertraline can be used whilst mothers are breast feeding

Post-natal depression is seen in around 2-3% of women

39%

Puerperal psychosis has a recurrence rate of around 20%

16%

Baby-blues are seen in the majority of women

14%

Post-natal depression usually develops within the first month

15%

Sertraline can be used whilst mothers are breast feeding

15%

Post-natal depression is seen in around 10% of women

Important for me

Less important

You are reviewing a 24-year-old man who complains of auditory hallucinations. These have become increasingly common and are now happening on a daily basis. Which one of the following factors in his history is the strongest risk factor for psychotic disorders?

- ☐ Indian subcontinent ethnicity
- ☐ Having a parent with schizophrenia
- ☐ A history of long-term cannabis use
- ☐ A history of being sexually abused when younger
- ☐ Working in the performing arts

Indian subcontinent ethnicity

3%

Having a parent with schizophrenia

71%

A history of long-term cannabis use

14%

A history of being sexually abused when younger

8%

Working in the performing arts

3%

Family history is the strongest risk factor for psychotic disorders

Important for me Less important

A 54-year-old man presents with a variety of physical symptoms that have been present for the past 9 years. Numerous investigations and review by a variety of specialties have indicated no organic basis for his symptoms. This is an example of:

- ☐ Munchausen's syndrome
- ☐ Hypochondrial disorder
- ☐ Dissociative disorder
- ☐ Somatisation disorder
- ☐ Conversion disorder

Munchausen's syndrome	10%
Hypochondrial disorder	15%
Dissociative disorder	10%
Somatisation disorder	55%
Conversion disorder	10%

Unexplained symptoms

- **S**omatisation = **S**ymptoms
- hypo**C**hondria = **C**ancer

Important for me Less important

Somatisation disorder is the correct answer as the patient is concerned about persistent, unexplained symptoms rather than an underlying diagnosis such as cancer (hypochondrial disorder). Munchausen's syndrome describes the intentional production of symptoms, for example self poisoning

A 31-year-old woman who gave birth two weeks ago presents for review with her husband. He is worried by her mood as she now seems depressed and is interacting poorly with the baby. He describes her mood three days ago being much different, when she was talking in a rapid and incoherent fashion about the future. The mother denies any hallucinations but states that her child has been brought into a 'very bad world'. What is the most appropriate management?

- ☐ Start fluoxetine
- ☐ Reassurance + review by health visitor
- ☐ Cognitive behavioural therapy
- ☐ Start lithium
- ☐ Arrange urgent admission

Start fluoxetine	10%
Reassurance + review by health visitor	18%
Cognitive behavioural therapy	16%
Start lithium	3%
Arrange urgent admission	54%

The mother may be suffering from puerperal psychosis and needs urgent admission to allow psychiatric evaluation.

Whilst there is not a full complement of psychotic features there are a number of pointers towards significant mental health problems:

- poor interaction with the baby: this is very unusual, including in women with postnatal depression
- 'talking in an incoherent fashion about the future'
- stating that the baby 'has been brought into a very bad world' is odd and somewhat worrying

For these reasons, the mother should have an urgent psychiatric evaluation.

A 64-year-old woman presents as she is feeling down and sleeping poorly. After speaking to the patient and using a validated symptom measure you decide she has moderate depression. She has a past history of ischaemic heart disease and currently takes aspirin, ramipril and simvastatin. What is the most appropriate course of action?

- ☐ Stop aspirin, start sertraline
- ☐ Start venlafaxine
- ☐ Start sertraline + lansoprazole
- ☐ Stop aspirin, start clopidogrel + sertraline
- ☐ Start sertraline

Stop aspirin, start sertraline

4%

Start venlafaxine

7%

Start sertraline + lansoprazole

52%

Stop aspirin, start clopidogrel + sertraline

8%

Start sertraline

29%

SSRI + NSAID = GI bleeding risk - give a PPI

Important for me Less important

There is an increased incidence of gastrointestinal bleeding when aspirin / NSAIDs are combined with selective serotonin reuptake inhibitors. This patient should therefore also be offered a proton pump inhibitor such as lansoprazole. It would be inappropriate to stop aspirin in a patient with a history of ischaemic heart disease.

Note the use of sertraline in this patient, the first-choice SSRI in patients with a history of cardiovascular disease.

Dr Assem

A 42-year-old woman presents for review. Her husband reports that she has had an argument with their son which resulted in him leaving home. Since this happened she has not been able to speak. Clinical examination of her throat and chest is unremarkable. Which one of the following terms best describes this presentation?

- ☐ Aprrosodia
- ☐ Schizophasia
- ☐ Expressive aphasia
- ☐ Akinetic mutism
- ☐ Psychogenic aphonia

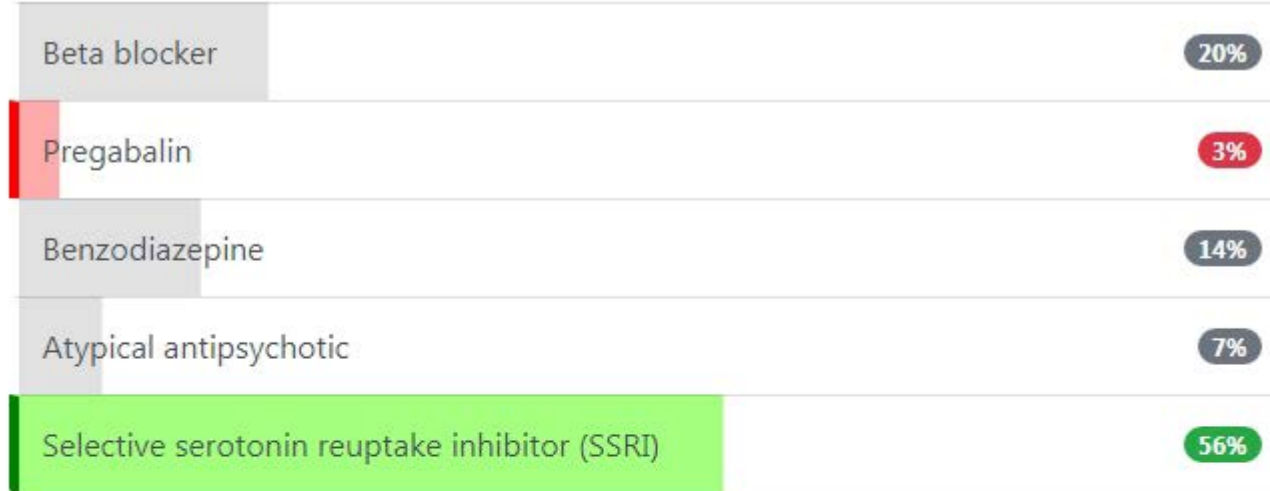


Psychogenic aphonia is considered to be a form of conversion disorder. Please see the link for more details.

You are reviewing a 24-year-old PhD student who presents with feeling on edge all of the time. He feels that nothing specific makes him feel worse. He cannot relax and as a result is not sleeping too well, but his appetite is good. He tells you that his mood is okay. You have reviewed him for several weeks with the same symptoms and despite referral to self-help sessions he has made no improvement.

Given the likely diagnosis, which pharmacological option is most likely to be indicated?

- ☐ Beta blocker
- ☐ Pregabalin
- ☐ Benzodiazepine
- ☐ Atypical antipsychotic
- ☐ Selective serotonin reuptake inhibitor (SSRI)



SSRIs are the first-line pharmacological therapy for generalised anxiety disorder

Important for me Less important

This scenario most likely represents generalised anxiety disorder. NICE recommend pharmacological therapy if low-intensity psychological interventions have been unsuccessful. Sertraline is recommended first-line, and if contraindicated or not tolerated then any other SSRI or serotonin noradrenaline reuptake inhibitor (SNRI). Pregabalin is indicated but only if these treatments have failed.

An 84-year-old female has been an inpatient in a psychiatric ward for the past 6 months with a fixed belief that her insides are rotting as she is deceased.

This type of delusion is known as which of the following?

- ☐ Cotard delusion
- ☐ Othello delusion
- ☐ De Clerambault syndrome
- ☐ Ekbom syndrome
- ☐ Capgras delusion

Cotard delusion	59%
Othello delusion	8%
De Clerambault syndrome	8%
Ekbom syndrome	10%
Capgras delusion	15%

Othello syndrome is a delusional belief that a patient's partner is committing infidelity despite no evidence of this. It can often result in violence and controlling behaviour.

De Clerambault syndrome (otherwise known as erotomania), is where a patient believes that a person of a higher social or professional standing is in love with them. Often this presents with people who believe celebrities are in love with them.

Ekbom syndrome is also known as delusional parasitosis and is the belief that they are infected with parasites or have 'bugs' under their skin. This can vary from the classic psychosis symptoms in narcotic use where the user can 'see' bugs crawling under their skin or can be a patient who believes that they are infested with snakes.

Capgras delusion is the belief that friends or family members have been replaced by an identical looking imposter.

A 45-year-old man who takes chlorpromazine for schizophrenia presents with severe restlessness. What side-effect of antipsychotic medication is this an example of?

- ☐ Akathisia
- ☐ Neuroleptic malignant syndrome
- ☐ Acute dystonia
- ☐ Tardive dyskinesia
- ☐ Parkinsonism

Akathisia

64%

Neuroleptic malignant syndrome

8%

Acute dystonia

7%

Tardive dyskinesia

16%

Parkinsonism

5%

Antipsychotics may cause akathisia (severe restlessness)

Important for me Less important



A 34-year-old man confides in you that he experienced childhood sexual abuse. Which one of the following features is not a characteristic feature of post-traumatic stress disorder?

☐ Hyperarousal

☐ Emotional numbing

☐ Nightmares

☐ Loss of inhibitions

☐ Avoidance

A 18-year-old sprinter who is currently preparing for a national athletics meeting asks to see the team doctor due to an unusual sensation in his legs. He describes a numb sensation below his knee. On examination the patient there is apparent sensory loss below the right knee in a non-dermatomal distribution. The team doctor suspects a non-organic cause of his symptoms. This is an example of a:

- ☐ Conversion disorder
- ☐ Hypochondrial disorder
- ☐ Somatisation disorder
- ☐ Malingering
- ☐ Munchausen's syndrome

Conversion disorder

48%

Hypochondrial disorder

9%

Somatisation disorder

26%

Malingering

10%

Munchausen's syndrome

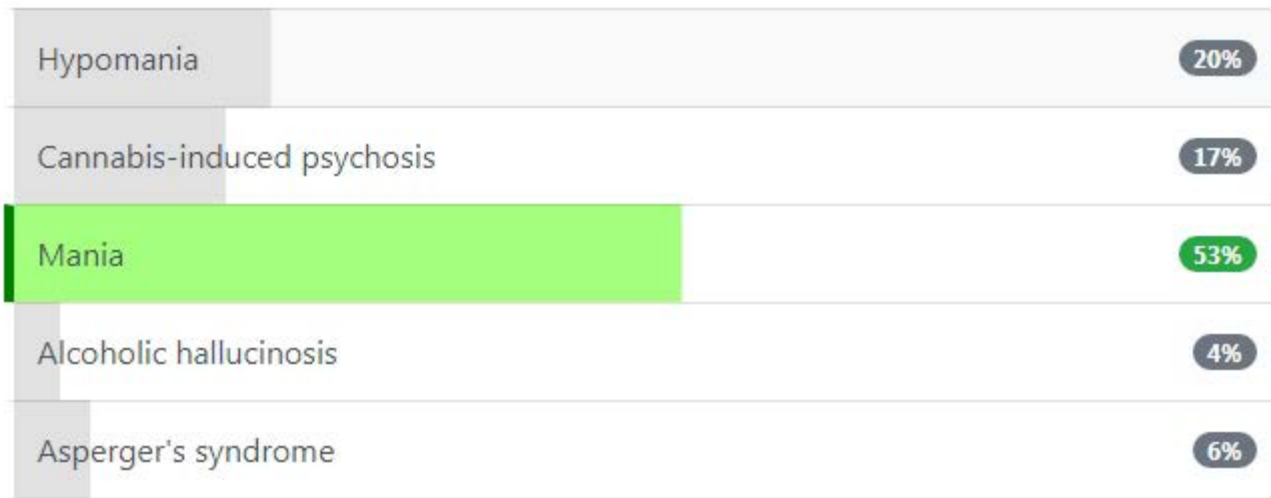
7%

Conversion disorder - typically involves loss of motor or sensory function. May be caused by stress

Important for me Less important

A 14-year-old boy is brought for review. He is normally fit and well and hasn't seen a doctor for over five years. His mother has been increasingly concerned about his behaviour in the past few weeks. She describes him staying up late at night, talking quickly and being very irritable. Yesterday he told his mother he was planning to 'take-over' the school assembly and give 'constructive criticism' to his teachers in front of the other pupils. He feels many of his teachers are 'underperforming' and need to be 'retaught' their subjects by him. He admits to trying cannabis once around six months ago and has drunk alcohol 'a few times' in the past year, the last time being two weeks ago. Prior to his deterioration a few weeks ago his mother describes him as a happy, well-adjusted, sociable young man. Which one of the following is the most likely diagnosis?

- ☐ Hypomania
- ☐ Cannabis-induced psychosis
- ☐ Mania
- ☐ Alcoholic hallucinosis
- ☐ Asperger's syndrome



Cannabis and alcohol related problems are very unlikely given how long ago he used those substances. The delusions of grandeur imply this is mania rather than hypomania.

A 24-year-old male is admitted to the Emergency Department complaining of severe abdominal pain. On examination he is shivering and rolling around the trolley. He has previously been investigated for abdominal pain and no cause has been found. He states that unless he is given morphine for the pain he will kill himself. This is an example of:

- ☐ Hypochondrial disorder
- ☐ Conversion disorder
- ☐ Malingering
- ☐ Munchausen's syndrome
- ☐ Somatisation disorder

Hypochondrial disorder

5%

Conversion disorder

4%

Malingering

71%

Munchausen's syndrome

11%

Somatisation disorder

9%

Lying or exaggerating for financial gain is malingering, for example someone who fakes whiplash after a road traffic accident for an insurance payment

Important for me Less important

This is difficult as the patient may well be an opiate abuser who is withdrawing. However, given the above options the most appropriate term to use is malingering as the patient is reporting symptoms with the deliberate intention of getting morphine

Dr. Arsem

A 34-year-old female has been suffering from depression for the past 3-years and is managed with sertraline and psychological interventions. During her most recent admission to the psychiatric intensive care unit, one of the nurses has noticed that she has been in a fairly fixed position for the past few hours and has not moved much. The patient does not appear agitated.

Which of the following would be an appropriate first-line treatment for the patient?

- ☐ Quetiapine
- ☐ Olanzapine
- ☐ Risperidone
- ☐ ECT
- ☐ Haloperidol

Quetiapine

11%

Olanzapine

15%

Risperidone

14%

ECT

47%

Haloperidol

13%

NICE suggest ECT is indicated for catatonic patients

Important for me Less important

The most appropriate treatment option in the list above is ECT (electroconvulsive therapy).

It would also be appropriate to administer a 2nd or 3rd generation anti-depressant such as fluoxetine or citalopram.

Anti-psychotics (such as olanzapine, quetiapine, risperidone, and haloperidol) are only indicated as an adjunct medication in some patients. It is not first-line for catatonia.

A 23-year-old man presents as he is concerned about a number of recent episodes related to sleep. He finds when he wakes up and less often when he is falling asleep he is 'paralysed' and unable to move. This sometimes associated with what the patient describes as 'hallucinations' such as seeing another person in the room. He is becoming increasingly anxious about these recent episodes. What is the most likely diagnosis?

- ☐ Frontal lobe epilepsy
- ☐ Generalised anxiety disorder
- ☐ Sleep paralysis
- ☐ Night terrors
- ☐ Acute schizophrenia

Frontal lobe epilepsy

5%

Generalised anxiety disorder

6%

Sleep paralysis

72%

Night terrors

11%

Acute schizophrenia

7%

A patient reports feeling unwell after suddenly stopping paroxetine. Which one of the following symptoms is most consistent with selective serotonin reuptake inhibitor discontinuation syndrome?

☐ Postural hypotension

☐ Diarrhoea

☐ Myoclonic jerks

☐ Hallucinations

☐ Seizures

Postural hypotension	14%
Diarrhoea	43%
Myoclonic jerks	17%
Hallucinations	15%
Seizures	11%

Gastrointestinal side-effects such as diarrhoea are seen in SSRI discontinuation syndrome

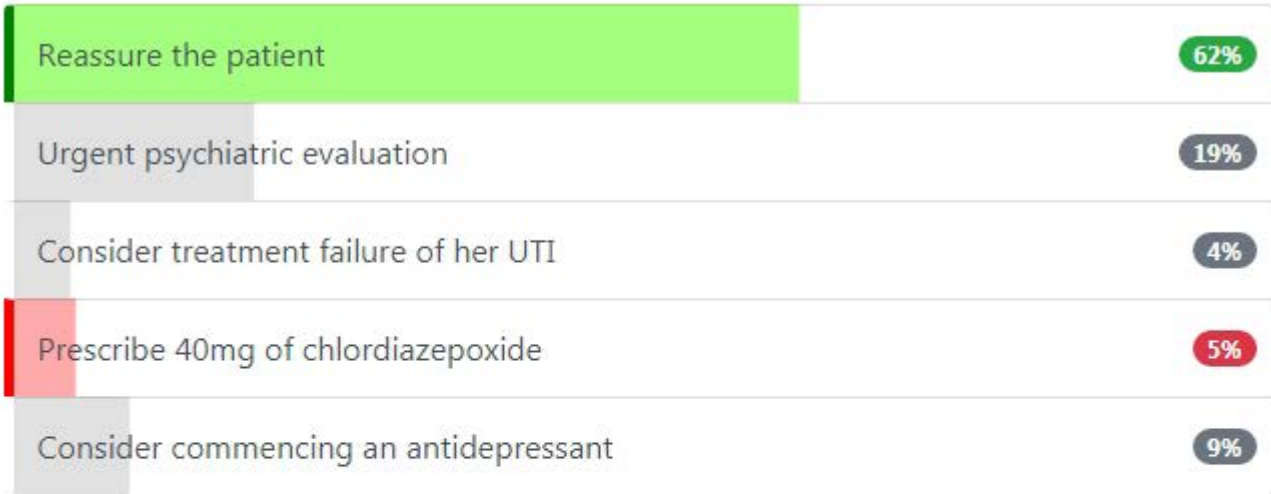
Important for me Less important

Selective serotonin reuptake inhibitor discontinuation syndrome can present with a wide variety of symptoms including diarrhoea, vomiting and abdominal pain.

A 93-year-old female patient on the ward is brought to your attention by the nurses. They are concerned she is experiencing visual hallucinations. She was admitted following a decline in mobility that was thought to be secondary to a urinary tract infection (UTI). She has improved clinically and biochemically during her time on the ward and she is awaiting a increase package of care before discharge.

You review the patient who tells you she earlier saw very small children running across the end of the bed. She reports she regularly sees similar images at home and has done so for many years. She has a background of hypertension, depression and age-related macular degeneration. What is the most appropriate step in this patient's management?

- ☐ Reassure the patient
- ☐ Urgent psychiatric evaluation
- ☐ Consider treatment failure of her UTI
- ☐ Prescribe 40mg of chlorthalidone
- ☐ Consider commencing an antidepressant



This most likely represents Charles Bonnet syndrome. Reassurance is usually the best treatment, helping people to understand and come to terms with their hallucinations. It is important to ensure there is not an alternative cause e.g. infection, psychosis, dementia (particularly Lewy body dementia), intoxication, metabolic abnormalities, focal neurological illness.

Dr Assem

A 25-year-old man demands a CT scan of his abdomen in clinic. He states it is 'obvious' he has cancer despite previous negative investigations. This is an example of a:

- ☐ Hypochondrial disorder
- ☐ Conversion disorder
- ☐ Munchausen's syndrome
- ☐ Dissociative disorder
- ☐ Somatisation disorder

Hypochondrial disorder

80%

Conversion disorder

6%

Munchausen's syndrome

5%

Dissociative disorder

3%

Somatisation disorder

5%

Unexplained symptoms

- **S**omatisation = **S**ymptoms
- hypo**C**hondria = **C**ancer

Important for me Less important

You review a patient who has been taking citalopram for the past two years to treat depression. He has felt well now for the past year and you agree a plan to stop the antidepressant. How should the citalopram be stopped?

- ☐ Can be stopped immediately
- ☐ Withdraw gradually over the next 3 days
- ☐ Withdraw gradually over the next week
- ☐ Withdraw gradually over the next 2 weeks
- ☐ Withdraw gradually over the next 4 weeks

Can be stopped immediately

6%

Withdraw gradually over the next 3 days

3%

Withdraw gradually over the next week

3%

Withdraw gradually over the next 2 weeks

13%

Withdraw gradually over the next 4 weeks

74%

When stopping a SSRI the dose should be gradually reduced over a 4 week period

Important for me Less important

Dr Assem

This not necessary with fluoxetine due to its longer half-life.

A 54-year-old man with a history of depression presents for review. He was started on fluoxetine eight weeks ago and is now requesting to stop his medication as he feels so well. What should be recommended regarding his treatment?

- ☐ It should be stopped straight away
- ☐ It should be continued for at least another 6 weeks
- ☐ It should be continued for at least another 3 months
- ☐ It should be continued for at least another 6 months
- ☐ It should be continued for at least another 12 months

A 54-year-old man with a history of depression presents for review. He was started on fluoxetine eight weeks ago and is now requesting to stop his medication as he feels so well. What should be recommended regarding his treatment?



Antidepressants should be continued for at least 6 months after remission of symptoms to decrease risk of relapse

Important for me Less important

This greatly reduces the risk of relapse. Patients should be reassured that antidepressants are not addictive.

Dr. Arsen

You are considering prescribing a selective serotonin reuptake inhibitor for a patient with depression. Which class of drug is most likely to interact with a selective serotonin reuptake inhibitor?

☐ Beta-blocker

☐ Thiazolidinediones

☐ Tetracycline

☐ Statin

☐ Triptan

Beta-blocker

9%

Thiazolidinediones

8%

Tetracycline

14%

Statin

11%

Triptan

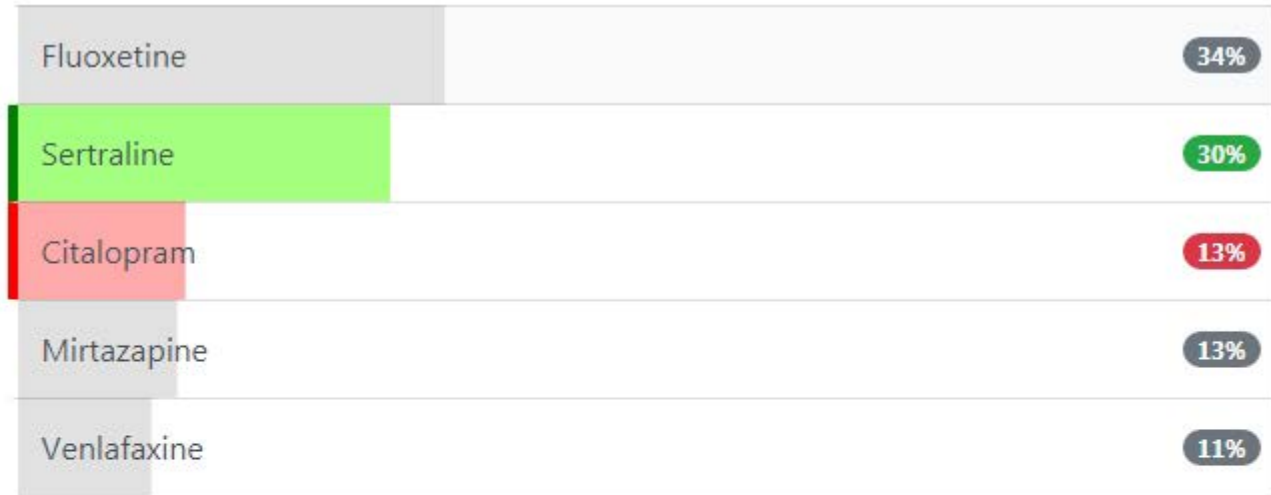
57%

Triptans should be avoided in patients taking a SSRI

Important for me Less important

Victoria has recently been diagnosed with agoraphobia and the psychiatrist plans to start medical treatment. Which is the first line medication used for agoraphobia?

- ☐ Fluoxetine
- ☐ Sertraline
- ☐ Citalopram
- ☐ Mirtazapine
- ☐ Venlafaxine



Agoraphobia is usually managed with sertraline

Important for me Less important

Agoraphobia is usually managed with sertraline. The other antidepressants may be used as second-line therapy depending on the patient's specific symptoms.

A 45-year-old man is admitted due to haematemesis. He reports drinking 120 units of alcohol a week. When is the peak incidence of seizures following alcohol withdrawal?

☐ 2 hours

☐ 6 hours

☐ 12 hours

☐ 24 hours

☐ 36 hours



Alcohol withdrawal

- symptoms: 6-12 hours
- seizures: 36 hours
- delirium tremens: 72 hours

Important for me Less important

A 29-year-old fireman presents following a recent traumatic incident where a child died in a house fire. He describes recurrent nightmares and flashbacks which have been present for the past 3 months. A diagnosis of post-traumatic stress disorder is suspected. What is the most appropriate first-line treatment?

- ☐ Arrange a CT head to exclude an organic cause
- ☐ Cognitive behavioural therapy or eye movement desensitisation and reprocessing therapy
- ☐ Cognitive behavioural therapy or graded exposure therapy
- ☐ Cognitive behavioural therapy or psychodynamic therapy
- ☐ Watchful waiting

Arrange a CT head to exclude an organic cause

6%

Cognitive behavioural therapy or eye movement desensitisation and reprocessing therapy

61%

Cognitive behavioural therapy or graded exposure therapy

12%

Cognitive behavioural therapy or psychodynamic therapy

11%

Watchful waiting

10%

A 62-year-old man is brought to the doctors by his daughter. Four weeks ago his wife died from metastatic breast cancer. He reports being tearful every day but his daughter is concerned because he is constantly 'picking fights' with her over minor matters and issues relating to their family past. The daughter also reports that he has on occasion described hearing his wife talking to him and on one occasion he prepared a meal for her.

Despite this he has started going walking again with friends and says that he is determined to get 'back on track'.

What is the most likely diagnosis?

- ☐ Atypical grief reaction
- ☐ Depression without psychotic features
- ☐ Delusional disorder
- ☐ Depression with psychotic features
- ☐ Normal grief reaction

Atypical grief reaction

19%

Depression without psychotic features

4%

Delusional disorder

4%

Depression with psychotic features

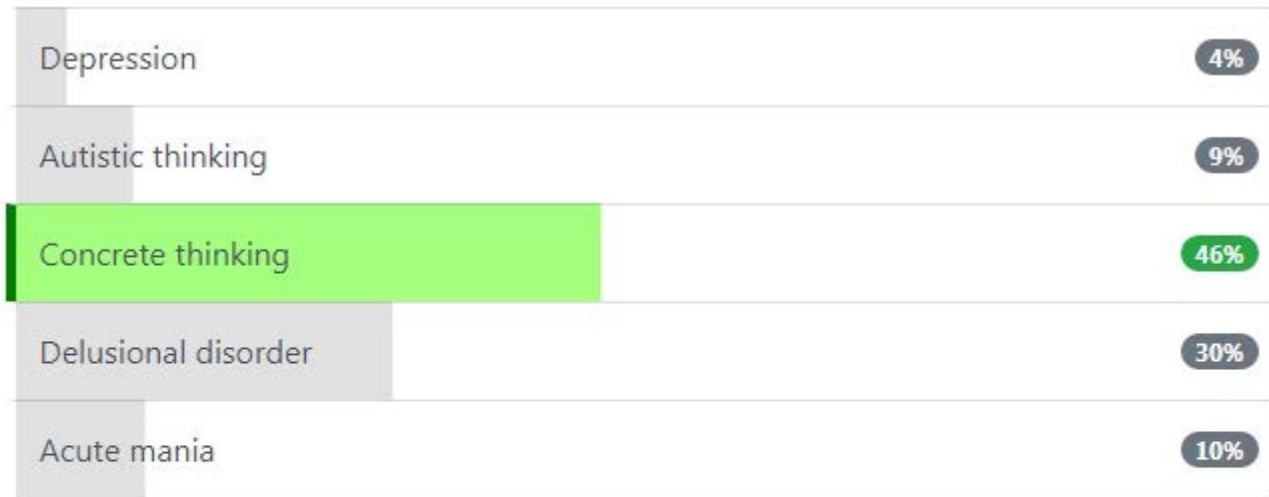
13%

Normal grief reaction

61%

A 24-year-old man is brought to the Emergency Department by his brother who is concerned about his odd behaviour. Over the past two weeks he has started to tell his brother that he can hear people talking about him on the radio. He denies any auditory hallucinations. During the consultation he scores 10/10 on the mini-mental state examination. When asked to explain the meaning of the statement 'people in glass houses shouldn't throw stones' he replies 'you may break the glass'. What is this an example of?

- ☐ Depression
- ☐ Autistic thinking
- ☐ Concrete thinking
- ☐ Delusional disorder
- ☐ Acute mania



This is an example of concrete thinking where a patient cannot use abstraction to understand the meaning of a sentence. It is more common in schizophrenia. Literal thinking is of course a feature of autism but this would not explain his delusional perception and is unlikely to present in a sub-acute fashion at this age

Which one of the following selective serotonin reuptake inhibitors has the highest incidence of discontinuation symptoms?

- ☐ Paroxetine
- ☐ Citalopram
- ☐ Escitalopram
- ☐ Fluoxetine
- ☐ Sertraline

Paroxetine

57%

Citalopram

11%

Escitalopram

6%

Fluoxetine

15%

Sertraline

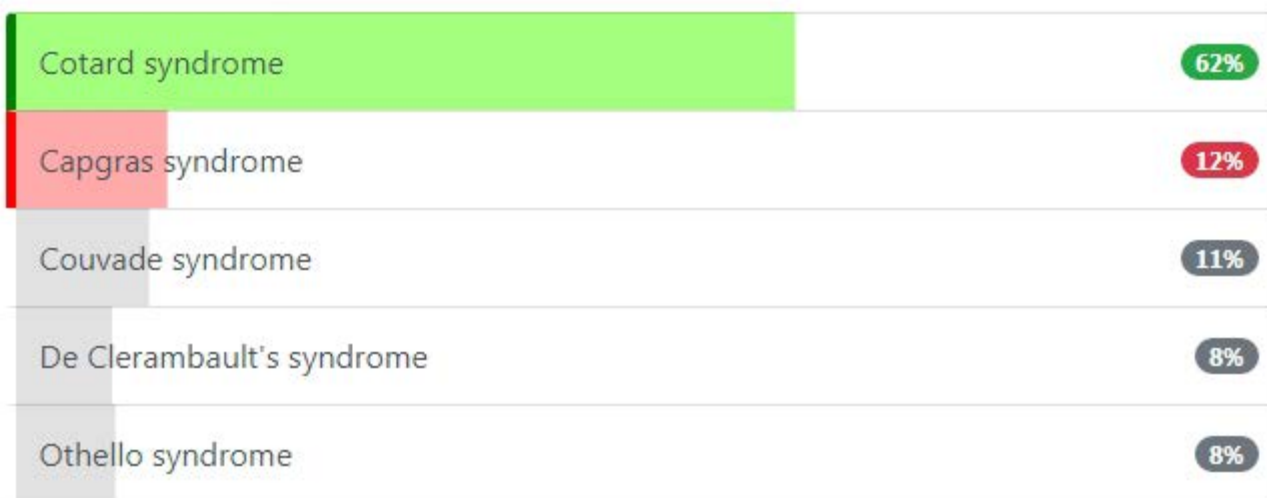
11%

Paroxetine - higher incidence of discontinuation symptoms

Important for me Less important

Carol is a 57-year-old lady who is under a section 3 at a an inpatient psychiatric hospital. She has stopped eating or drinking as she believes she is dead and does not require food anymore. Which syndrome is characterised by a person believing they are dead or non-existent?

- ☐ Cotard syndrome
- ☐ Capgras syndrome
- ☐ Couvade syndrome
- ☐ De Clerambault's syndrome
- ☐ Othello syndrome



Cotard syndrome is characterised by a person believing they are dead or non-existent

Important for me Less important

Cotard syndrome is characterised by a person believing they are dead or non-existent. It tends to be related to depression.

Capgras syndrome is characterised by a person believing their friend or relative had been replaced by an exact double.

Couvade syndrome is also known as 'sympathetic pregnancy'. It affects fathers, particularly during the first and third trimesters of pregnancy, who suffer the somatic features of pregnancy.

De Clerambault's syndrome is characterised by a person believing that another individual (often a celebrity) is deeply in love with them. It typically affects females.

Othello syndrome is when the patient believes their partner is cheating on them. They may be threatening or stalk their partner. This seems to affect males more than females.

A 36-year-old patient presents with nausea, headaches and palpitations. He has had multiple previous admissions with such symptoms over the past 2 years, each time no organic cause was found. What kind of disorder is this likely to represent?

- ☐ Munchausen's syndrome
- ☐ Hypochondrial disorder
- ☐ Somatisation disorder
- ☐ Conversion disorder
- ☐ Dissociative disorder

Munchausen's syndrome

9%

Hypochondrial disorder

10%

Somatisation disorder

71%

Conversion disorder

6%

Dissociative disorder

4%

Unexplained symptoms

- **S**omatisation = **S**ymptoms
- hypo**C**hondria = **C**ancer

Important for me Less important

A 60-year-old male is admitted to the in-patient psychiatric unit last night. On reviewing him this morning, he is a poor historian, answering most questions minimally and stating he does not need to be here as he is deceased, and hospitals should be for living patients.

What is the name of this delusional disorder and which condition is it most commonly associated with?

- ☐ De Clerambault's syndrome and Major Depressive Disorder
- ☐ Cotard syndrome and Major Depressive Disorder
- ☐ Othello syndrome and Paranoid Schizophrenia
- ☐ Capgras delusion and Dementia
- ☐ Charles de Bonnet syndrome and Bipolar Disorder

De Clerambault's syndrome and Major Depressive Disorder

7%

Cotard syndrome and Major Depressive Disorder

79%

Othello syndrome and Paranoid Schizophrenia

4%

Capgras delusion and Dementia

6%

Charles de Bonnet syndrome and Bipolar Disorder

3%

Cotard syndrome is associated with severe depression

Important for me [Less important](#)

This patient is presenting with Cotard's syndrome, a rare subtype of nihilistic delusions, in which they believe they or part of them is dead or does not exist. This is seen most commonly in severe depression, but is also associated with schizophrenia.

Dr. Assen

A 58-year-old lady presents to her GP concerned her partner is being unfaithful. She appears very distressed by this yet after further questioning does not appear to have any evidence to support her claims, yet she is convinced she is right. What might this concern be a symptom of?

- ☐ Capgras' delusion
- ☐ Grandiose delusion
- ☐ de Clérambault's syndrome
- ☐ Othello's syndrome
- ☐ Charles Bonnet syndrome

Capgras' delusion	10%
Grandiose delusion	5%
de Clérambault's syndrome	10%
Othello's syndrome	70%
Charles Bonnet syndrome	5%

De Clérambault's syndrome also called erotomania is a delusional belief that someone else is in love with the patient. Charles Bonnet syndrome is the experience of complex visual hallucinations in patients with partial or severe blindness.

A 21-year-old female is admitted to the acute medical unit after a paracetamol overdose. She later admits to multiple episodes of impulsive self-harm and overdoses. She reports that her recent overdose was triggered by a fight with her dad and concerns that he will no longer want to see her. She describes long-standing feelings of emptiness and does not like the way she looks.

What is the most likely underlying personality disorder?

- ☐ Narcissistic personality disorder
- ☐ Paranoid personality disorder
- ☐ Borderline personality disorder
- ☐ Dependant personality disorder
- ☐ Avoidant personality disorder

Narcissistic personality disorder	5%
Paranoid personality disorder	8%
Borderline personality disorder	66%
Dependant personality disorder	13%
Avoidant personality disorder	8%

Borderline personality disorder is associated with impulsivity, feelings of emptiness, fear of abandonment and unstable self image

Important for me Less important

The correct answer is borderline personality disorder. Patients with personality disorder have disturbances in behaviour and personality that result in considerable personal and social distress across all areas of life. Borderline or emotionally unstable personality disorder is characterised by emotional instability, impulsive behaviour and intense but unstable relationships with others. Patients often fear abandonment of those close to them and may idolise these people. As in the patient described, they often have feelings of emptiness, poor self-image and recurrent attempts at self-harm. There is an association between the development of borderline personality disorder and history of trauma or abuse in childhood.

Narcissistic personality disorder is incorrect. These patients have an over exaggerated sense of self-importance, lack empathy and tend to have a sense of entitlement.

Option 2 is incorrect. Paranoid personality disorder presents in patients who are reluctant to confide in others. They often question the loyalty of friends and family and can be unforgiving. They can see hidden meaning in things or are concerned about conspiracy theories.

Patients with dependent personality disorder struggle to make everyday life decisions and require reassurance and support from others. They cope best when in a relationship and fear being alone. Whilst there are features in the stem of the patient idolising her father there is no evidence of dependent personality disorder.

Option 5 is also incorrect. Avoidant personality disorder is characterised by avoidance of social contact/relationships due to fear of being criticised, rejected or embarrassed. Patients view themselves as inferior to others and so are not keen to be involved unless they are certain of being liked.

Further information on personality disorder can be found in the ICD 10 guide - <http://apps.who.int/classifications/icd10/browse/2016/en#/F66>

A 34-year-old ex-soldier with a history of post-traumatic stress disorder returns for review. He has had a course of eye movement desensitisation and reprocessing therapy which was not helpful and is reluctant to try cognitive behavioural therapy. Of the options listed, which medication may be useful in such patients?

- ☐ Fluoxetine
- ☐ Citalopram
- ☐ Mirtazapine
- ☐ Topiramate
- ☐ Bupropion

Fluoxetine

36%

Citalopram

14%

Mirtazapine

43%

Topiramate

3%

Bupropion

5%

An 88-year-old woman is brought to her GP by her daughter because of new memory problems. She did not want to attend as she is worried about her memory and does not want to be diagnosed with dementia. She scores 12 out of 30 on a mini-mental state exam.

Her memory is globally impaired with failure to retain new information as well as failure to remember important events from her life. Her daughter reports this has been the case for the past two months and she was previously fine and had no cognitive concerns. Her daughter also reports she is struggling with sleep and her appetite has reduced significantly in this time although the patient does not think this is the case.

What is the most likely cause of her memory impairment?

- ☐ Alzheimer's disease
- ☐ Chronic small vessel ischaemia
- ☐ Lewy body disease
- ☐ Acute delirium
- ☐ Depression

Alzheimer's disease	29%
Chronic small vessel ischaemia	6%
Lewy body disease	8%
Acute delirium	6%
Depression	51%

Severe depression can mimic dementia but gives a pattern of global memory loss rather than short-term memory loss - this is called pseudodementia

Important for me Less important

It can often be difficult to ascertain the cause of memory impairment off a single encounter but there are three main causes to consider:

- A dementia process.
- An acute delirium.
- Depression (also called pseudodementia).

The key features here which indicate it is not a dementia process are the short length of time (less than six months) and global memory loss. The biological symptoms of poor sleep and loss of appetite as well as worry about memory would also not fit with a dementia process. You would expect an early stage dementia patient to remember significant life events which occurred many years earlier as the first memory issues that occur are usually related to loss of short-term memory and inability to remember new things.

Depression can produce a dementia-like picture in a very short time period in the elderly and for this reason it is sometimes known as pseudo-dementia.

A 65-year-old male with a background of chronic alcohol excess and previous Wernicke's encephalopathy is admitted to the acute medical take with behavioural disturbance. He has not consumed alcohol in the past 2 years.

Which of the following phenomena is he likely to display on further assessment?

☐ Confabulation

☐ Dysthymia

☐ Hydrophobia

☐ Lilliputians

☐ Perseveration

Confabulation

71%

Dysthymia

8%

Hydrophobia

5%

Lilliputians

6%

Perseveration

10%

Confabulation in a patient with chronic alcoholism points towards Korsakoff's syndrome

Important for me Less important

Korsakoff's is characterised by confabulation and amnesia, typically occurring in alcoholics secondary to chronic vitamin B1 (thiamine) deficiency. Dysthymia refers to mild depression; hydrophobia is a feature of rabies; lilliputians may be observed in delirium tremens; perseveration is repetitive speech patterns, commonly seen after traumatic brain injury.

A 21-year-old female patient is being investigated for a personality disorder. She is found to be low in self-esteem and fearful of criticism or rejection, particularly in social situations. She reports struggling to make friends at work despite being desperate to be liked. She feels that her colleagues are much better at her job than her. She becomes very anxious every day on the way to work as she worries she will make a fool of herself. As a result, she struggles to hold down a job often moving jobs regularly. She has had the same experience with relationships out of work as she does not feel good enough for anyone.

What is the most likely diagnosis?

- ☐ Dependant personality disorder
- ☐ Paranoid personality disorder
- ☐ Borderline personality disorder
- ☐ Histrionic personality disorder
- ☐ Avoidant personality disorder

Dependant personality disorder	13%
Paranoid personality disorder	12%
Borderline personality disorder	10%
Histrionic personality disorder	7%
Avoidant personality disorder	57%

Patients with avoidant personality disorder are fearful of criticism, being unliked, rejection and ridicule

Important for me Less important

The correct answer here is 5 - avoidant personality disorder. Patients with personality disorder have disturbances in behaviour and personality that result in considerable personal and social distress across all areas of life. As in the stem, patients with avoidant personality disorder tend to avoid social contact/relationships due to fear of being criticised, rejected or embarrassed. They view themselves as inferior to others and so are not keen to be involved unless they are certain of being liked. They sometimes have an overwhelming sense of tension or apprehension.

Patients with dependent personality disorder struggle to make everyday life decisions and require reassurance and support from others. They tend to lack initiative and feel they are unable to look after themselves. They cope best when in a relationship and fear being alone. As such this not the correct answer.

Paranoid personality disorder presents in patients who are reluctant to confide in others. They often question the loyalty of friends and family and can be unforgiving. They can see hidden meaning in things or are concerned about conspiracies. There is no evidence of paranoid personality disorder in this stem.

Borderline personality disorder is characterized by emotional instability, impulsive behaviour and intense but unstable relationships with others. They often have feelings of emptiness, poor self-image and recurrent attempts at self-harm. Again making this an incorrect answer.

Histrionic personality disorder is seen in patients who crave being the centre of attention, they can be sexually inappropriate in behaviour or appearance and suggestible. These are not the features described in the stem.

Further information on personality disorder can be found in the ICD 10 guide - <http://apps.who.int/classifications/icd10/browse/2016/en#/F66>

An elderly patient in a nursing home is started on quetiapine due to persistent aggressive behaviour that has not responded to non-pharmacological approaches. Which of the following adverse effects do antipsychotics increase the risk of in elderly patients?

- ☐ Atrial fibrillation
- ☐ Myocardial infarction
- ☐ Aspiration pneumonia
- ☐ Stroke
- ☐ Breast cancer

Atrial fibrillation

9%

Myocardial infarction

14%

Aspiration pneumonia

6%

Stroke

69%

Breast cancer

2%

Antipsychotics in the elderly - increased risk of stroke and VTE

Important for me

Less important

A 39-year-old patient is taking phenelzine, a monoamine oxidase inhibitor, for the treatment of depression. Which one of the following foods can the patient safely eat?

☐ Bovril

☐ Cheese

☐ Oxo

☐ Eggs

☐ Broad beans

Bovril

10%

Cheese

12%

Oxo

10%

Eggs

47%

Broad beans

20%

Dr. Arsem

Which one of the following is **not** a recognised feature of anorexia nervosa?

- ☐ Hypokalaemia
- ☐ Low LH
- ☐ Impaired glucose tolerance
- ☐ Low FSH
- ☐ Reduced growth hormone levels

Hypokalaemia

11%

Low LH

8%

Impaired glucose tolerance

32%

Low FSH

8%

Reduced growth hormone levels

40%

Anorexia features

- most things low
- **G's** and **C's** raised: **g**rowth hormone, **g**lucose, salivary **g**lands, **c**ortisol, **c**holesterol, **c**arotinaemia

Important for me Less important

Which one of the following side-effects is more common with atypical than conventional anti-psychotics?

- ☐ Akathisia
- ☐ Weight gain
- ☐ Galactorrhoea
- ☐ Parkinsonism
- ☐ Tardive dyskinesia

Akathisia

9%

Weight gain

61%

Galactorrhoea

8%

Parkinsonism

9%

Tardive dyskinesia

12%

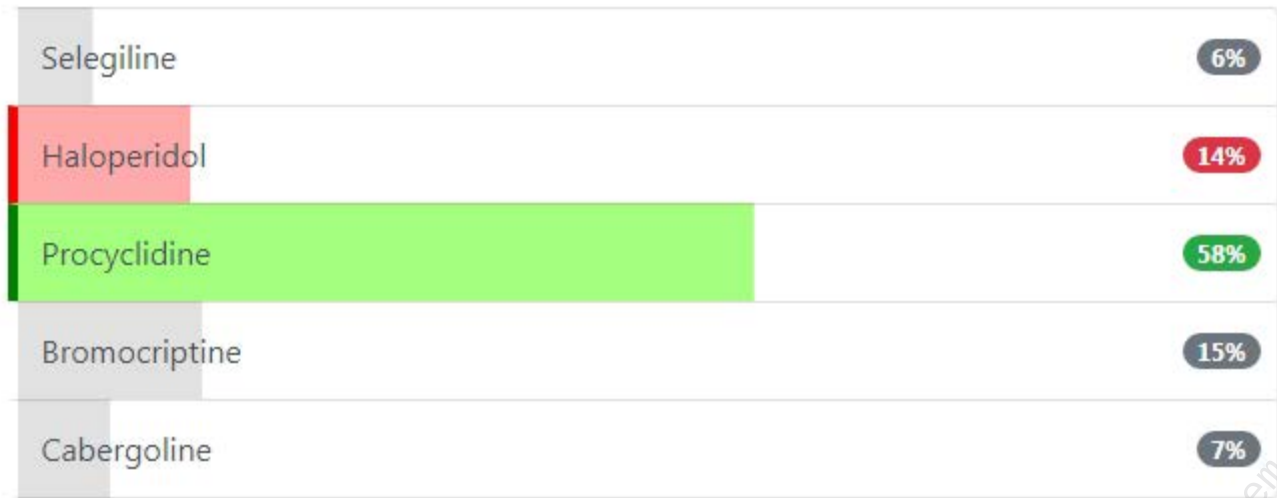
Atypical antipsychotics commonly cause weight gain

Important for me

Less important

A 35-year-old man with a history of schizophrenia is transferred to the Emergency Department due to an oculogyric crisis. What is the most appropriate treatment?

- ☐ Selegiline
- ☐ Haloperidol
- ☐ Procyclidine
- ☐ Bromocriptine
- ☐ Cabergoline



Benzotropine is also an appropriate treatment

You are looking after a 36-year-old female patient on the ward when you become concerned regarding her behavior towards you. She has made a number of sexually inappropriate comments and on your last review she was wearing seductive underwear. She is often disruptive on the ward making a scene and easily encouraged by other patients. Your consultant advises you to avoid seeing the patient on her own and that he is aware the patient has a personality disorder.

What is her most likely diagnosis?

- ☐ Histrionic personality disorder
- ☐ Schizoid personality disorder
- ☐ Schizotypal personality disorder
- ☐ Antisocial personality disorder
- ☐ Borderline personality disorder

Histrionic personality disorder	69%
Schizoid personality disorder	7%
Schizotypal personality disorder	9%
Antisocial personality disorder	5%
Borderline personality disorder	10%

Histrionic personality disorder is characterised by inappropriate sexual seductiveness, suggestibility and intense relationships

Important for me Less important

The correct answer is 1 - histrionic personality disorder. This condition is seen in patients who crave being the center of attention, can be sexually inappropriate in behavior or appearance and are highly suggestible. They can develop intense relationships but at other times read more into the intimacy of a relationship that is actually there.

Option 2 is incorrect. Patients with schizoid personality disorder tend to have a lack of interest in sexual interactions making this an unlikely diagnosis based on the patient in question. They are often cold and lack close friendships, preferring to spend time alone.

Patients with schizotypal personality disorder can have odd/eccentric beliefs or behavior. Similarly to the patient in this question they can be inappropriate however struggle to make friends and can be paranoid/suspicious making this less likely the correct answer.

Patients with antisocial personality disorder often fail to comply to social norms in terms of lawful behavior resulting in multiple arrests. They are prone to getting into fights due to aggressiveness and can be deceitful particularly when seeking material gain. They can have a disregard for safety and lack remorse. This does not describe the patient in the stem.

Option 5 is also incorrect, borderline personality disorder is characterised by emotional instability, impulsive behavior, feelings of emptiness and recurrent attempts at self harm. Similarly to histrionic personality disorder they also have intense relationships however these are often unstable.

A 72-year-old man who is having trouble sleeping is prescribed temazepam. What is the mechanism of action of temazepam?

- ☐ Inhibits the effect of acetylcholine
- ☐ Enhances the effect of gamma-aminobutyric acid
- ☐ Inhibits the effect gamma-aminobutyric acid
- ☐ Inhibits the effect of glutamate
- ☐ Inhibits the effect of noradrenaline

Inhibits the effect of acetylcholine

8%

Enhances the effect of gamma-aminobutyric acid

50%

Inhibits the effect gamma-aminobutyric acid

28%

Inhibits the effect of glutamate

7%

Inhibits the effect of noradrenaline

6%

Benzodiazepines enhance the effect of GABA, the main inhibitory neurotransmitter

Important for me Less important

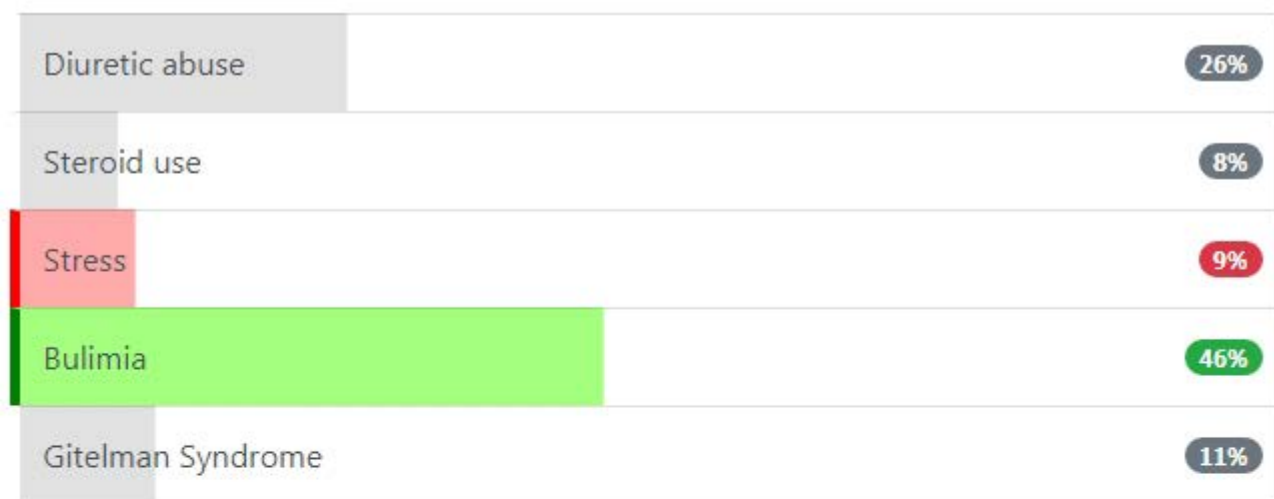
A slim 22 year-old drama student presents with weakness and muscle cramps. She has a past medical history of reflux and asthma, for which she takes lansoprazole 30mg once daily, inhaled salbutamol PRN, and once-daily inhaled corticosteroid. She reports feeling stressed lately as she has a leading role in a significant stage production due to open in one week. Her heart rate is 87bpm, blood pressure 103/71mmHg, respiratory rate 13/min. Her blood results are shown:

pH	7.46
Na+	137 mmol/L
K+	2.6 mmol/L
Chloride	93 mmol/L
Magnesium	0.61 mmol/L

What is the most likely cause for her symptoms?

- ☐ Diuretic abuse
- ☐ Steroid use
- ☐ Stress
- ☐ Bulimia
- ☐ Gitelman Syndrome

Dr Assem



This is a hard question reflecting a difficult real-world challenge: differentiating between causes of hypochloraemia, which can be caused (amongst others) by Gitelman syndrome, bulimia and diuretic abuse. Inhaled steroid use and stress would not be responsible for such marked electrolyte derangement. Gitelman syndrome, although fitting, is very rare and would not be considered the most likely diagnosis. As such the two remaining options are bulimia and diuretic abuse. The scales are tipped towards bulimia by the mild metabolic alkalosis and history of gastroesophageal reflux (more prevalent in bulimia) requiring high-dose PPI to control - an unusual requirement in a young slim patient. Other potential signs would be parotid gland swelling and dental enamel erosion induced by regular vomiting. Diuretic abuse tends to give a hypochloraemic acidosis.

A 34-year-old man originally from West Africa is seen in January with depression. There is no past medical history of note but he is known to smoke cannabis. He has had similar episodes for the past two winters. What is the most likely diagnosis?

- ☐ Cyclothymic disorder
- ☐ Atypical depression
- ☐ Seasonal affective disorder
- ☐ Schizophrenia
- ☐ Drug-induced depression

Cyclothymic disorder

10%

Atypical depression

5%

Seasonal affective disorder

71%

Schizophrenia

6%

Drug-induced depression

8%

You review a 45-year-old man with a long history of bipolar disorder. According to NICE and National Patient Safety Agency (NPSA) guidelines, how often should lithium levels be checked once a stable dose has been achieved?

- ☐ Every month
- ☐ Every 2 months
- ☐ Every 3 months
- ☐ Every 4 months
- ☐ Every 6 months

Every month

11%

Every 2 months

8%

Every 3 months

54%

Every 4 months

5%

Every 6 months

21%

Lithium levels should be checked every 3 months once a stable dose has been achieved

Important for me Less important

A 23-year-old male presents to his GP two weeks after a road traffic accident concerned about increased anxiety levels, lethargy and headache. At the time he had a CT brain after banging his head on the steering wheel, which revealed no abnormality. Six months following this episode his symptoms have resolved. What did his original symptoms likely represent?

- ☐ Conversion disorder
- ☐ Post-traumatic stress disorder
- ☐ Somatisation disorder
- ☐ Generalised anxiety disorder
- ☐ Post-concussion syndrome

Conversion disorder

6%

Post-traumatic stress disorder

27%

Somatisation disorder

5%

Generalised anxiety disorder

7%

Post-concussion syndrome

56%

In post-traumatic stress disorder the onset of symptoms is usually delayed and it tends to run a prolonged course

Dr Assem

A 47-year-old alcoholic has been brought to the emergency department by his brother. His brother states that he has been confused for the last few days and has fallen over a few times. On examination, he has an unsteady gait. He cannot remember the first female prime minister of the UK or the journey to the emergency department. He claimed he went to the park yesterday - which his brother states are untrue. Considering the clinical picture, what is the most likely diagnosis?

- ☐ Wernicke's encephalopathy
- ☐ Korsakoff's syndrome
- ☐ Alzheimer's disease
- ☐ Acute delirium
- ☐ Lewy-body dementia

Wernicke's encephalopathy	26%
Korsakoff's syndrome	57%
Alzheimer's disease	4%
Acute delirium	9%
Lewy-body dementia	5%

Korsakoff's syndrome is a complication of Wernicke's encephalopathy. Its features include: anterograde amnesia, retrograde amnesia, and confabulation

Important for me [Less important](#)

Wernicke's encephalopathy is characterised by ataxia, ophthalmoplegia and confusion. This patient had confusion and an unsteady gait (a sign of ataxia). However, the patient has symptoms of Korsakoff's syndrome: anterograde amnesia (unable to form new memories), retrograde amnesia (unable to recall past memories) and confabulation (making up new memories) suggesting his Wernicke's encephalopathy has progressed.

Alzheimer's disease generally affects memory in a stepwise progression. Lewy-body dementia classically has signs of parkinsonism and also hallucinations.

Which of the following types of tricyclic antidepressant is considered the safest in overdose?

☐ Nortriptyline

☐ Imipramine

☐ Dosulepin

☐ Lofepramine

☐ Clomipramine

Nortriptyline

18%

Imipramine

17%

Dosulepin

18%

Lofepramine

36%

Clomipramine

10%

Lofepramine - the safest TCA in overdose

Important for me Less important

The sister of a 34-year-old man comes to see you in clinic as she is worried her brother may have a personality disorder. She reports her brother has always had a heightened opinion of himself and often expresses delusional thoughts regarding his potential for success as a banker believing he is capable of making millions. He does not seem perturbed by bringing others down in the process and appears pleased when he talks of others failures. She remembers he behaved similarly when they were growing up and was unsympathetic towards her when she had to resit her finals due to ill health.

What personality disorder is she describing?

- ☐ Antisocial personality disorder
- ☐ Schizoid personality disorder
- ☐ Schizotypal personality disorder
- ☐ Borderline personality disorder
- ☐ Narcissistic personality disorder

Antisocial personality disorder	6%
Schizoid personality disorder	8%
Schizotypal personality disorder	8%
Borderline personality disorder	5%
Narcissistic personality disorder	73%

Narcissistic personalities lack empathy, have a sense of entitlement and take advantage of others to achieve their own need

Important for me Less important

The correct answer is narcissistic personality disorder. Whilst her brother may not actually qualify for having a personality disorder if his behaviour does not cause him personal distress or prevent him functioning socially, many of these features are seen in narcissistic behaviour. These patients have a heightened impression of self-importance and entitlement often believing they have unlimited abilities to succeed, become powerful or look beautiful. Additionally, they lack empathy and will happily take advantage of others to achieve their own need. In keeping with many personality disorders his symptoms appear to have been present since childhood and into adult life.

Patients with antisocial personality disorder also lack empathy or feelings of guilt/remorse. Similarly to narcissistic personalities they can be deceitful when wanting to achieve their own need. However, in contrast to narcissists they often fail to comply with rules or laws resulting in criminal offences and are prone to getting into fights. As such the patient in the stem fits more closely with narcissistic personality disorder.

Patients with schizoid personality disorder tend to have a lack of interest in sexual interactions are cold and lack close friendships preferring to spend time alone. They are also indifferent to praise making this unlikely to be the correct answer.

Option 3 is incorrect. Patients with schizotypal personality disorder can have odd/eccentric beliefs or behaviour. They can also struggle to make friends and can be paranoid/suspicious as opposed to lacking empathy or having a sense of entitlement.

Option 5 is also incorrect, borderline personality disorder is characterized by emotional instability, impulsive behaviour, feelings of emptiness and recurrent attempts at self-harm.

Which class of drug have the Medicines and Healthcare products Regulatory Agency warned may be associated with an increased risk of venous thromboembolism in elderly patients?

- ☐ Tricyclic antidepressants
- ☐ 5HT3 antagonists
- ☐ Third generation cephalosporins
- ☐ Benzodiazepines
- ☐ Atypical antipsychotics

Tricyclic antidepressants

16%

5HT3 antagonists

9%

Third generation cephalosporins

4%

Benzodiazepines

5%

Atypical antipsychotics

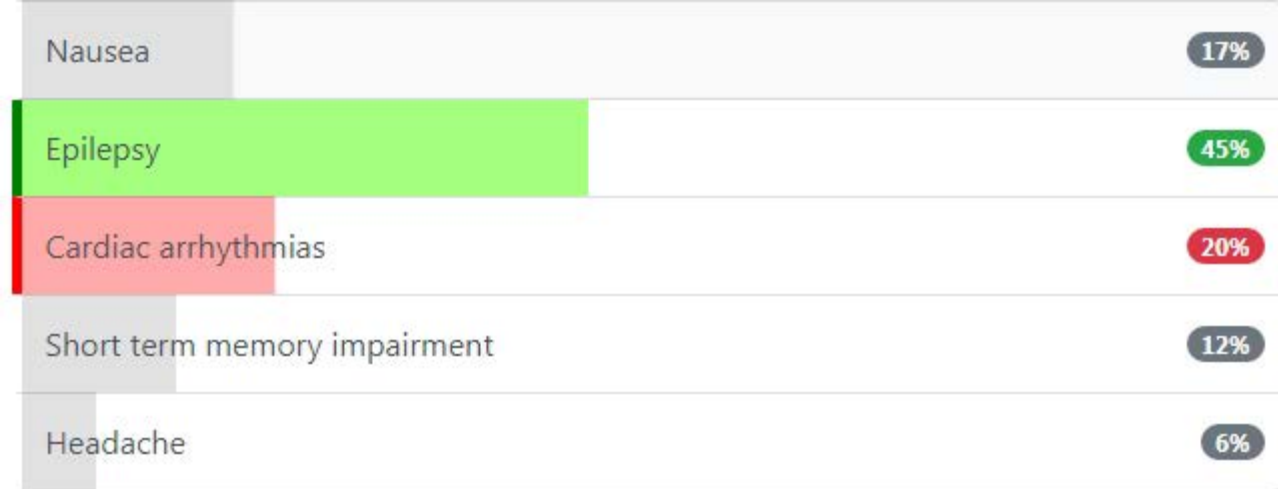
65%

Antipsychotics in the elderly - increased risk of stroke and VTE

Important for me Less important

Which one of the following is least recognised as a potential adverse effect of electroconvulsive therapy?

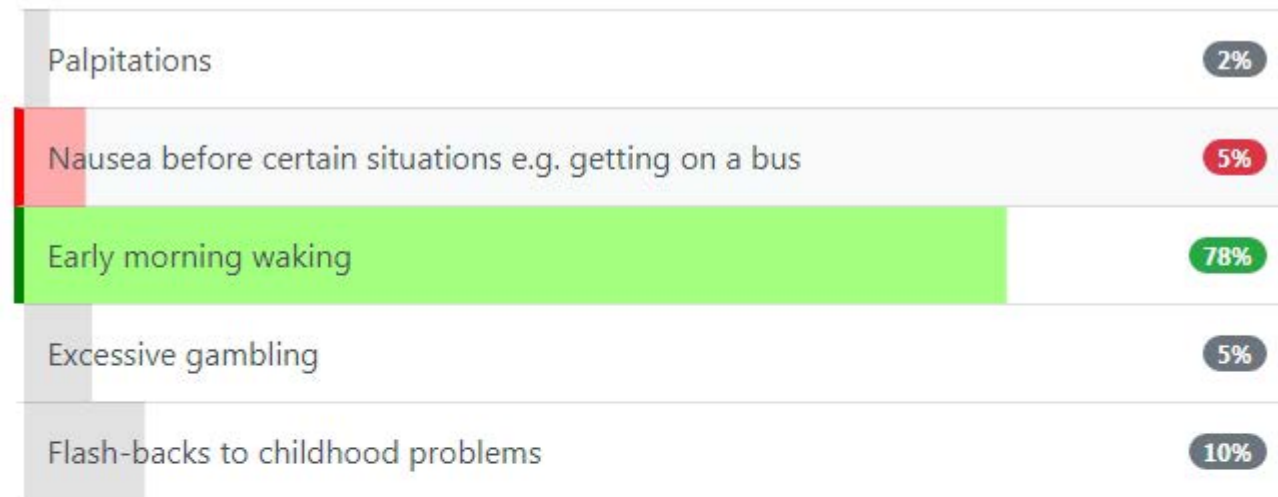
- ☐ Nausea
- ☐ Epilepsy
- ☐ Cardiac arrhythmias
- ☐ Short term memory impairment
- ☐ Headache



Although electroconvulsive therapy, by definition, causes a controlled seizure there is no increased risk of epilepsy in the long-term.

A 30-year-old man presents to his doctor as he has been feeling generally 'out of sorts' for the past few weeks. He is accompanied by his girlfriend who says he has 'not been himself'. She is worried and feels he may need to see a psychiatrist. There is no history of past mental health problems. Which one of the following symptoms would be most suggestive of depression?

- ☐ Palpitations
- ☐ Nausea before certain situations e.g. getting on a bus
- ☐ Early morning waking
- ☐ Excessive gambling
- ☐ Flash-backs to childhood problems



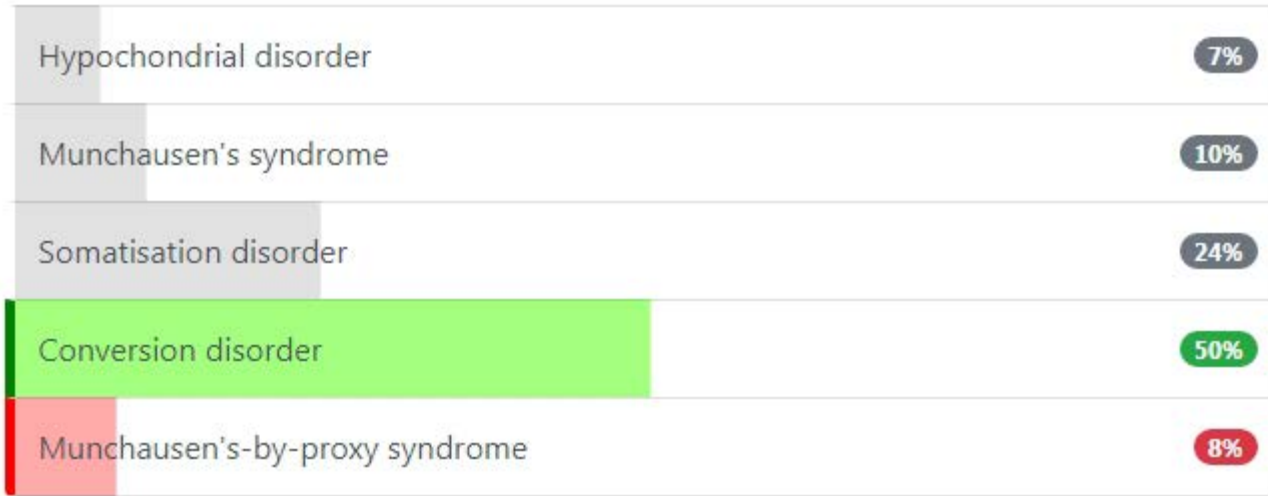
Early morning waking is a classic somatic symptom of depression and often develops earlier than general insomnia.

Palpitations and nausea are more common with anxiety. Excessive gambling may suggest either a simple gambling addiction or be part of a hypomanic/manic disorder.

Flash-backs are common in post-traumatic stress disorder.

A 16-year-old girl is brought for review by her father. She is talented violinist and is due to start music college in a few weeks time. Her parents are concerned she has had a stroke as she is reporting weakness on her right side. Neurological examination is inconsistent and you suspect a non-organic cause for her symptoms. Despite reassurance about the normal examination findings the girl remains unable to move her right arm. What is the most appropriate term for this behaviour?

- ☐ Hypochondrial disorder
- ☐ Munchausen's syndrome
- ☐ Somatisation disorder
- ☐ Conversion disorder
- ☒ Munchausen's-by-proxy syndrome



Conversion disorder - typically involves loss of motor or sensory function. May be caused by stress

Important for me Less important

This is a typical conversion disorder. There may be underlying tension regarding her musical career which be manifesting itself as apparent limb weakness.

Dr Assem

A 39-year-old man comes for review. Six months ago he was started on paroxetine for depression. Around five days ago he stopped taking the medication as he felt that it was having no benefit. His only past medical history of note is asthma. For the past two days he has experienced increased anxiety, sweating, headache and the feeling of a needle like sensation in his head. During the consultation he is pacing around the room. What is the most explanation for his symptoms?

- ☐ Bipolar disorder
- ☐ Malingering
- ☐ Selective serotonin reuptake inhibitor discontinuation syndrome
- ☐ Migraine
- ☐ Generalised anxiety disorder

Bipolar disorder

3%

Malingering

3%

Selective serotonin reuptake inhibitor discontinuation syndrome

88%

Migraine

2%

Generalised anxiety disorder

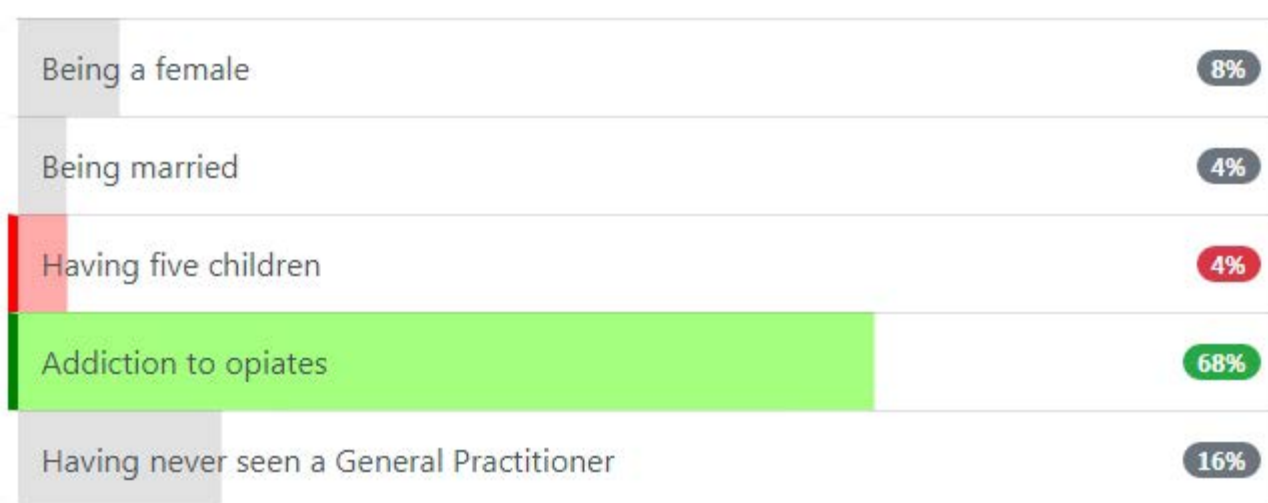
5%

Paroxetine has a higher incidence of discontinuation symptoms than other selective serotonin reuptake inhibitors.

A 52-year-old man is brought into the emergency department having attempted to take his own life. He was found at home with empty packets of paracetamol by his side. He is still conscious. A history is taken from him to assess his risk of further attempts.

Which of the following is considered to be the strongest risk factor for successful suicide?

- ☐ Being a female
- ☐ Being married
- ☐ Having five children
- ☐ Addiction to opiates
- ☐ Having never seen a General Practitioner



A male with a history of alcohol or drug abuse and deliberate self harm should be considered to be at high risk of suicide

Important for me Less important

This question requires you to recall the major risk factors for suicide.

Being a female - This is not the most appropriate answer given the options available. In fact, being male is one of the most significant risk factors for suicide.

Being married - This is not the most appropriate answer given the options available. Having family support is an important protective factor for suicide.

Having five children - This is not the most appropriate answer given the options available. Having children at home is thought to be a protective factor.

Addiction to opiates - This is correct. Alcohol or drug misuse is one of the major risk factors for suicide.

Having never seen a General Practitioner - This is not the most appropriate answer given the options available. Having a chronic mental or physical condition is however a risk factor for suicide.

You are considering prescribing a tricyclic antidepressant for a patient who has not responded to two different types of selective serotonin reuptake inhibitors. Which one of the following tricyclic antidepressants is most dangerous in overdose?

- ☐ Dosulepin
- ☐ Imipramine
- ☐ Clomipramine
- ☐ Nortriptyline
- ☐ Lofepramine

Dosulepin

49%

Imipramine

14%

Clomipramine

12%

Nortriptyline

15%

Lofepramine

10%

Dosulepin - avoid as dangerous in overdose

Important for me Less important

A 73-year-old male patient who lives alone presents with recurrent episodes of pleasant visual hallucinations but no clouding of consciousness or confusion. He tells you he knows the hallucinations are not real. He is normally fit and well with the exception of visual impairment.

Given the likely diagnosis, what ophthalmic condition is he most likely to suffer from?

- ☐ Glaucoma
- ☐ Diabetic retinopathy
- ☐ Retinal detachment
- ☐ Age-related macular degeneration
- ☐ Cataract

Glaucoma	7%
Diabetic retinopathy	4%
Retinal detachment	6%
Age-related macular degeneration	71%
Cataract	11%

Age-related macular degeneration is associated with Charles-Bonnet syndrome

Important for me Less important

This patient has Charles-Bonnet syndrome (CBS) as evidenced by visual hallucinations with normal insight on a background of visual impairment. He also lives alone which could be another risk factor for CBS if this leads to him becoming socially isolated. 11-15% of patient with severe visual impairment are thought to have coexisting CBS and experience recurrent, persistent or episodic visual or auditory hallucinations. The most common ophthalmological condition associated with CBS is age-related macular degeneration and hence this is the correct answer.

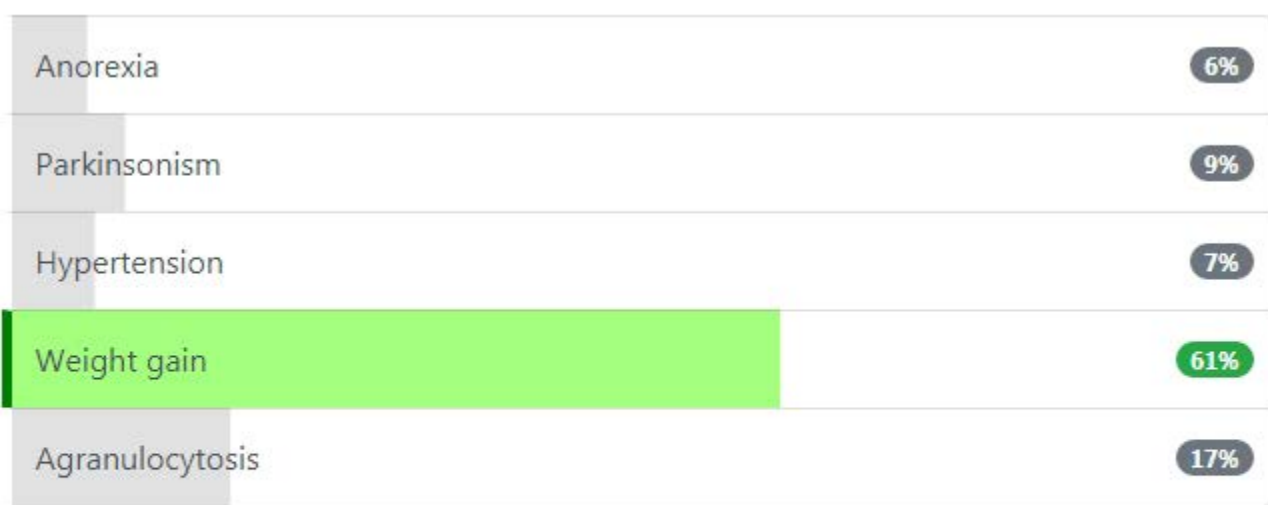
Glaucoma and cataract are the next most common causes of visual impairment associated with CBS. CBS can, however, occur in any ophthalmic condition making 1,2,3 and 5 all possible but less common causes than age-related macular degeneration.

It is important to note that the hallucinations are related to failing eyesight and are not a sign of an underlying psychiatric condition.

Dr. Assem

A 25-year-old man with a history of schizophrenia is prescribed olanzapine. Which one of the following adverse effects is he most likely to experience?

- ☐ Anorexia
- ☐ Parkinsonism
- ☐ Hypertension
- ☐ Weight gain
- ☐ Agranulocytosis



Weight gain is an extremely common adverse effect of atypical antipsychotics such as olanzapine

A 26-year-old female presents to the Emergency Department feeling suicidal after the breakdown of her relationship two weeks ago. She reports being fearful of being on her own as he had made all major decisions in their relationship as she is not capable of making correct choices. She has tried online dating since her relationship broke down but despite multiple dates has not yet found a new partner.

She advises you she was previously diagnosed with a personality disorder. What is the most likely diagnosis?

- ☐ Borderline personality disorder
- ☐ Paranoid personality disorder
- ☐ Narcissistic personality disorder
- ☐ Dependent personality disorder
- ☐ Avoidant personality disorder

Borderline personality disorder	18%
Paranoid personality disorder	4%
Narcissistic personality disorder	3%
Dependent personality disorder	71%
Avoidant personality disorder	4%

Patients with dependant personality disorder require excessive reassurance from others, seek out relationships and require others to take responsibility for major life decisions

Important for me Less important

The correct answer is dependent personality disorder. The patient in the question is struggling to cope after the breakdown of a relationship. Patients with this personality disorder struggle to make everyday life decisions and require reassurance and support from others. They feel they are unable to look after themselves and become fearful when left to do so. As in this patient whose relationship only broke down 2 weeks ago but has already been on multiple dates, they cope best when in a relationship and urgently seek out new relationships if one fails. They will often passively comply with the wishes of others.

Borderline personality disorder is characterised by emotional instability, impulsive behaviour and intense but unstable relationships with others. Patients often fear abandonment but do not seek out excessive reassurance and are able to make life decisions making this the incorrect answer.

In contrast to dependent personality disorder, paranoid personality disorder presents in patients who are reluctant to confide in others, question the loyalty of friends and family and can be unforgiving.

Narcissistic personality disorder is incorrect. These patients have an over-exaggerated sense of self-importance, lack empathy and tend to have a sense of entitlement.

Avoidant personality disorder is different from dependent personality disorder in that patients avoid social contact/relationships due to fear of being criticised, rejected or embarrassed. Patients view themselves as inferior to others and so are not keen to be involved unless they are certain of being liked.

Further information on personality disorder can be found in the ICD 10 guide - <http://apps.who.int/classifications/icd10/browse/2016/en#/F66>

A 82-year-old female who has glaucoma starts to experience visual hallucinations which include seeing goldfish, black boxes and mud sliding down shelves. She is completely blind in the right eye and only partially sighted in the left eye. What is the most likely diagnosis?

- ☐ Schizophrenia
- ☐ Delirium
- ☐ Charles Bonnet syndrome
- ☐ Peduncular hallucinosis
- ☐ Anton's syndrome

Schizophrenia	4%
Delirium	4%
Charles Bonnet syndrome	81%
Peduncular hallucinosis	7%
Anton's syndrome	4%

In a patient who is partially or fully blind and experiencing visual hallucinations, Charles Bonnet syndrome should be considered. Delirium and schizophrenia also present with visual hallucinations, but with the history of blindness, Charles Bonnet syndrome is the more likely diagnosis.

Anton's syndrome is a rare symptom of brain damage occurring in the occipital lobe characterised by cortical blindness, but will not accept they are blind despite being told that they are. They don't have visual hallucinations

Peduncular hallucinosis is a rare neurological disorder that causes vivid visual hallucinations in dark environments which last for several minutes. They typically occur after a midbrain stroke. This diagnosis is less likely given the history of blindness.

A woman who gave birth 5 days ago presents for review as she is concerned about her mood. She is having difficulty sleeping and feels generally anxious and tearful. Since giving birth she has also found herself snapping at her husband. This is her first pregnancy, she is not breast feeding and there is no history of mental health disorders in the past. What is the most appropriate management?

- ☐ Explanation and reassurance
- ☐ Cognitive behavioural therapy
- ☐ Trial of fluoxetine
- ☐ Trial of citalopram
- ☐ Discuss with psychiatric team to consider admission to mother and baby unit

Explanation and reassurance

64%

Cognitive behavioural therapy

12%

Trial of fluoxetine

7%

Trial of citalopram

5%

Discuss with psychiatric team to consider admission to mother and baby unit

11%

This woman has the baby-blues which is seen in around two-thirds of women. Whilst poor sleeping can be a sign of depression it is to be expected with a new baby!

A 68-year-old gentleman is brought into hospital by his husband who says he has reported seeing flashing images of foxes and badgers in their living room. This is something that is extremely distressing to the patient, and has made him reluctant to venture into some areas of the house. You wonder if this might be Charles-Bonnet syndrome.

Which of the following risk factors may pre-dispose this gentleman to Charles-Bonnet syndrome?

- ☐ Caucasian
- ☐ Peripheral visual impairment
- ☐ Male gender
- ☐ Hypertension
- ☐ Occupational history of working in sewers

Caucasian

5%

Peripheral visual impairment

76%

Male gender

8%

Hypertension

6%

Occupational history of working in sewers

6%

Charles-Bonnet syndrome - peripheral visual impairment is a risk factor

Important for me Less important

Charles-Bonnet syndrome is characterised by visual hallucinations associated with eye disease.

Most common visual hallucinations are faces, children and wild animals.

It occurs in patients of increasing age; equally amongst males and females; and with no known increased risk with family history.

Dr. Arsem

A 33-year-old female is brought to the GP by her concerned mother. The patient reports that the prime minister is secretly in love with her, despite her mother protesting there has never been any contact between them. Which psychiatric disorder does this fit with?

- ☐ Couvade syndrome
- ☐ Bouffée délirante
- ☐ Fregoli delusion
- ☐ Capgras delusion
- ☐ De Clerambault's syndrome

Couvade syndrome	10%
Bouffée délirante	6%
Fregoli delusion	13%
Capgras delusion	14%
De Clerambault's syndrome	56%

Bouffée délirante is an acute psychotic disorder in which hallucinations, delusions or perceptual disturbances are obvious but markedly variable, changing from day to day or even from hour to hour.

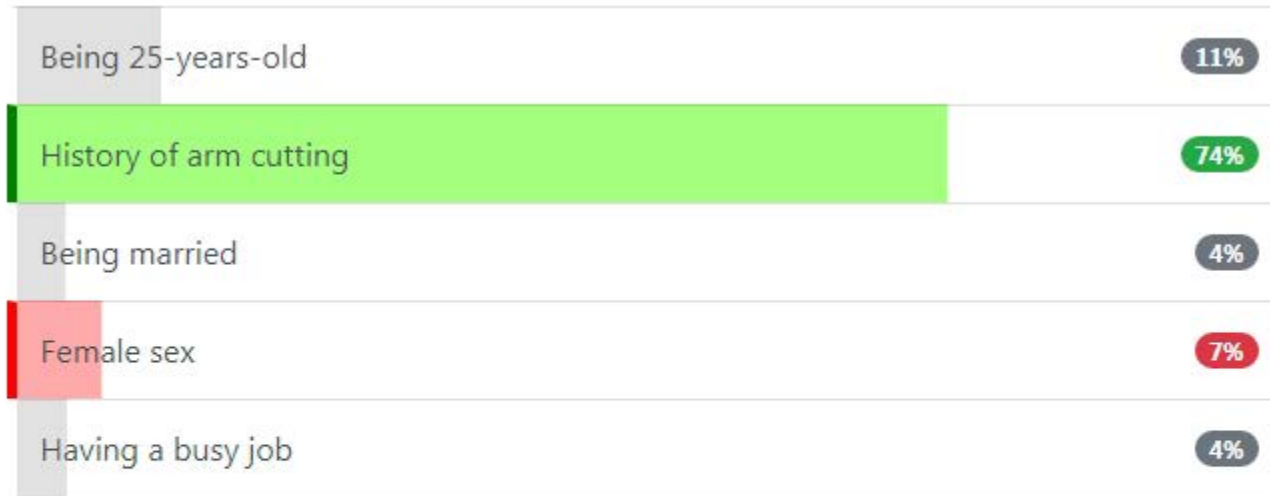
Fregoli delusion is the mistaken belief that some person currently present in the deluded person's environment (typically a stranger) is a familiar person in disguise.

Capgras delusion is the belief that significant others have been replaced by impostors, robots or aliens.

Couvade is the common but poorly understood phenomenon whereby the expectant father experiences somatic symptoms during the pregnancy for which there is no recognised physiological basis.

A patient with a history of depression presents for review. Which one of the following suggests an increased risk of suicide?

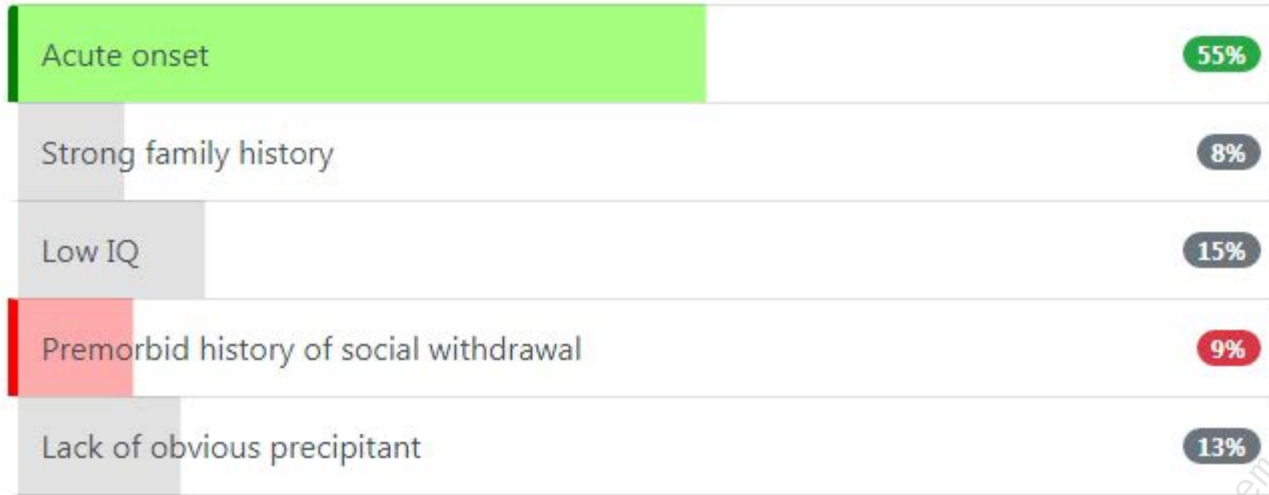
- ☐ Being 25-years-old
- ☐ History of arm cutting
- ☐ Being married
- ☐ Female sex
- ☐ Having a busy job



Whilst arm cutting may sometimes be characterised as attention-seeking or 'releasing the pain' studies show that any history of deliberate self harm significantly increases the risk of suicide. Employment is a protective factor

Which one of the following is not associated with a poor prognosis in schizophrenia?

- ☐ Acute onset
- ☐ Strong family history
- ☐ Low IQ
- ☐ Premorbid history of social withdrawal
- ☐ Lack of obvious precipitant



A gradual, rather than acute, onset is associated with a poor prognosis

A 27-year-old woman is brought in by her husband. She has been refusing to go outside for the past 3 months, telling her husband she is afraid of catching avian flu. On exploring this further she is concerned due to the high number of migrating birds she can see in her garden. She reports that the presence of her husband's socks on the washing line in the garden alerted her to this. What is the most likely diagnosis?

- ☐ Depression
- ☐ Hypochondrial disorder
- ☐ Formal thought disorder
- ☐ Borderline personality disorder
- ☐ Acute paranoid schizophrenia



The washing line comment is an example of a delusional perception - see below

A 46-year-old man is seen by an occupation health doctor due to long-term sickness leave. He states chronic lower back pain prevents him from working but examination findings are inconsistent and the doctor suspects a non-organic cause of his symptoms. This is an example of a:

- ☐ Conversion disorder
- ☐ Munchausen's syndrome
- ☐ Malingering
- ☐ Hypochondrial disorder
- ☐ Somatisation disorder

Conversion disorder

7%

Munchausen's syndrome

9%

Malingering

60%

Hypochondrial disorder

4%

Somatisation disorder

19%

Lying or exaggerating for financial gain is malingering, for example someone who fakes whiplash after a road traffic accident for an insurance payment

Important for me Less important

Which one of the following features is least recognised in long-term lithium use?

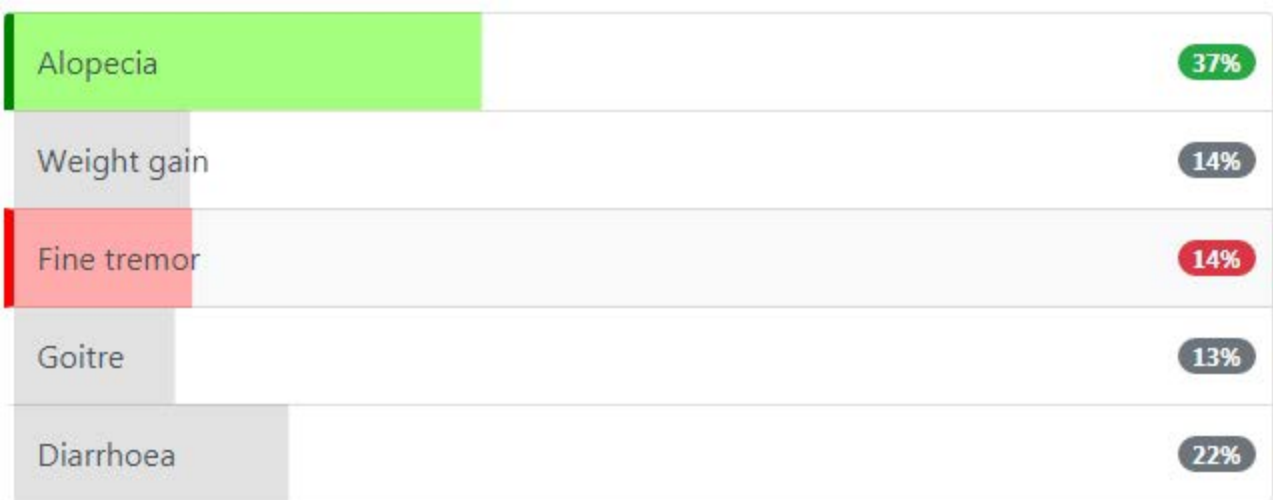
☐ Alopecia

☐ Weight gain

☐ Fine tremor

☐ Goitre

☐ Diarrhoea



All the above side-effects, with the exception of alopecia, may be seen in patients taking lithium

Enid, an 87-year-old lady, is experiencing disturbing visual hallucinations. She sees 'evil' looking faces on the walls and snakes and insects on the floor. She knows that these are not real. She has no auditory hallucinations. She is otherwise well. She has a history of hypertension, depression, hearing loss and macular degeneration. What is the most likely cause of her hallucinations?

- ☐ Lewy body dementia
- ☐ Psychotic depression
- ☐ Acute psychosis
- ☐ Charles Bonnet syndrome
- ☐ Normal pressure hydrocephalus

Lewy body dementia	14%
Psychotic depression	8%
Acute psychosis	6%
Charles Bonnet syndrome	67%
Normal pressure hydrocephalus	5%

Charles-Bonnet syndrome causes unpleasant visual hallucinations in a third of sufferers

Important for me Less important

The cause of this lady's visual hallucinations is Charles Bonnet syndrome. Around a third of sufferers may experience disturbing or unpleasant hallucinations.

Lewy body dementia may involve visual hallucinations alongside fluctuating cognitive impairment, but in the absence of any current neuropsychiatric symptoms this makes this a less likely diagnosis.

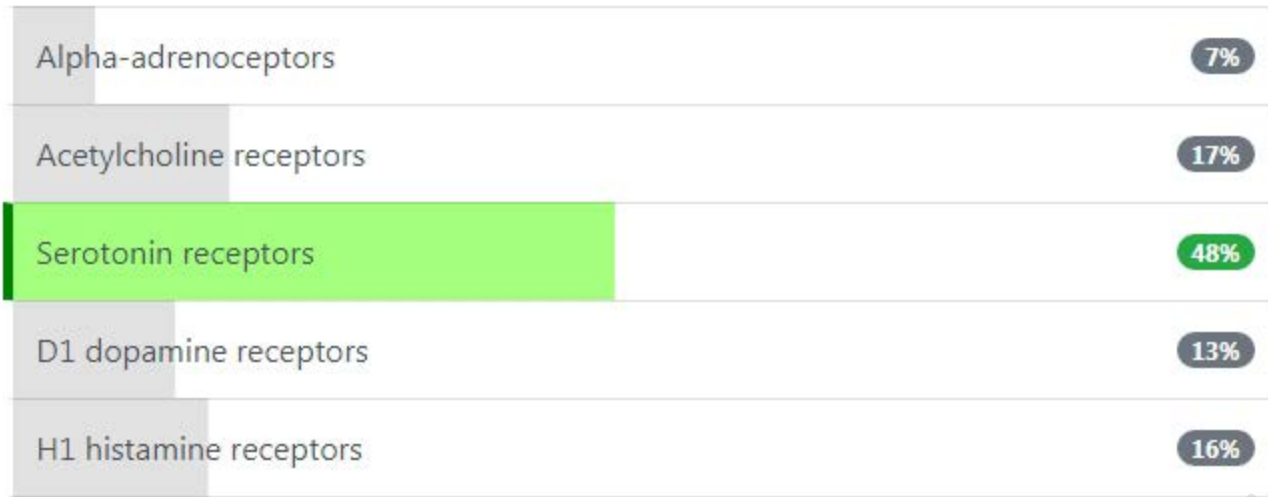
Acute psychosis tends to involve auditory hallucinations associated with delusions.

Psychotic depression would usually involve severe symptoms of depression with the development of psychotic symptoms.

Normal pressure hydrocephalus does not usually involve visual hallucinations.

Olanzapine is known to block D2 dopamine receptors. What other type of receptor does it mainly act on?

- ☐ Alpha-adrenoceptors
- ☐ Acetylcholine receptors
- ☐ Serotonin receptors
- ☐ D1 dopamine receptors
- ☐ H1 histamine receptors



Olanzapine, like other atypical antipsychotics, is known to block serotonin receptors (especially the 5-HT₂ subtype) as well as D₂ dopamine receptors

A patient you are looking after is started on imipramine for depression. Which combination of side-effects is most likely to be seen in a patient taking this class of antidepressants?

- ☐ Dry mouth + urinary frequency
- ☐ Hypertension + sweating
- ☐ Gastrointestinal bleeding + dyspepsia
- ☐ Headache + myoclonus
- ☐ Blurred vision + dry mouth



These antimuscarinic side-effects are more common with imipramine than other types of tricyclic antidepressants.

Dr Assem

An 80-year-old man presents with recurrent episodes of hallucinations. He describes often seeing faces smaller than normal or other objects out of proportion. He finds these episodes distressing although he says he knows they're not real. His past medical history includes macular degeneration and an episode of depression 20 years ago following the death of his wife. Neurological examination is unremarkable. What is the most likely diagnosis?

- ☐ Schizophrenia
- ☐ Charles-Bonnet syndrome
- ☐ Psychotic depression
- ☐ Cerebral tumour
- ☐ Alzheimer's disease

Schizophrenia

5%

Charles-Bonnet syndrome

81%

Psychotic depression

6%

Cerebral tumour

4%

Alzheimer's disease

4%

A 19-year-old woman presents to the Emergency department having taken an overdose of 40x500mg paracetamol tablets and 400ml of vodka. She took the overdose because her boyfriend is going away for 2 weeks on a course and she fears abandonment. This is her 4th attendance with an overdose over the past 3 years. She is also known to the police after an episode of reckless driving / road rage. On arrival in the unit she is tearful and upset, and tells you she did it because her boyfriend is leaving her. Vital signs and general physical examination are normal apart from evidence of cutting her arms. She is given activated charcoal. Which of the following is the most likely diagnosis?

- ☐ Bipolar disorder
- ☐ Anti-social personality disorder
- ☐ Borderline personality disorder
- ☐ Endogenous depression
- ☐ Drug induced psychosis

Bipolar disorder	9%
Anti-social personality disorder	9%
Borderline personality disorder	69%
Endogenous depression	8%
Drug induced psychosis	5%

Borderline personality disorder is marked out by instability in moods, behaviour and relationships.

Diagnosis is confirmed by the presence of at least 5 of the following symptoms;

- 1) Extreme reactions including panic, depression, rage, or frantic actions to abandonment, whether real or perceived
- 2) A pattern of intense and stormy relationships with family, friends, and loved ones, often veering from extreme closeness and love to extreme dislike or anger
- 3) Distorted and unstable self-image or sense of self, which can result in sudden changes in feelings, opinions, values, or plans and goals for the future (such as school or career choices)
- 4) Impulsive and often dangerous behaviours, such as spending sprees, unsafe sex, substance abuse, reckless driving, and binge eating
- 5) Recurring suicidal behaviours or threats or self-harming behaviour, such as cutting
Intense and highly changeable moods, with each episode lasting from a few hours to a few days
- 6) Chronic feelings of emptiness and/or boredom
- 7) Inappropriate, intense anger or problems controlling anger
- 8) Having stress-related paranoid thoughts or severe dissociative symptoms, such as feeling cut off from oneself, observing oneself from outside the body, or losing touch with reality.

There are no features consistent with endogenous depression, such as early morning wakening or loss of appetite, and no features consistent with hypomania such as pressure of speech, flight of ideas, or over exuberant behaviour. We are given no indication of drug abuse which may indicate drug induced psychosis. Anti-social personality disorder is characterised by a failure to conform to social norms, and repeated law breaking. There is consistent irresponsibility, impulsivity and disregard for both their own safety and that of others.

The mother of a 28-year-old male who has been diagnosed with a personality disorder comes to see you. She reports that her son has been arrested multiple times and can often be aggressive getting into fights. As a teenager, he would lie to obtain money, played truant and would say unpleasant hurtful things to her without apology or apparent regret. He has never held down a job and relies on his parents for financial support.

His mother has the name of the condition he has been diagnosed with and knows you are not able to discuss the individual case. She asks if you can provide generic information on his condition to aid her understanding as she has always blamed herself for his behaviour.

What is the most likely condition her son has been diagnosed with?

- ☐ Avoidant personality disorder
- ☐ Antisocial personality disorder
- ☐ Borderline personality disorder
- ☐ Narcissistic personality disorder
- ☐ Histrionic personality disorder

Avoidant personality disorder

5%

Antisocial personality disorder

65%

Borderline personality disorder

13%

Narcissistic personality disorder

11%

Histrionic personality disorder

6%

Patients with antisocial personality disorder often fail to conform to social norms, and show lack of remorse, deception and irresponsibility

Important for me Less important

The correct answer here is 2 - antisocial personality disorder. Patients with this condition often fail to comply with social norms in terms of lawful behaviour resulting in multiple arrests. They are prone to getting into fights due to aggressiveness and can be deceitful particularly when seeking material gain. They can have a disregard for the safety of themselves and others and are irresponsible, failing to support themselves financially. When they do act inappropriately or in a hurtful way to others, they are unable to show remorse for their actions. There is often a history of problems such as truancy in childhood. Their behaviour can have a significant impact on family life and so it is understandable that his mother may have blamed herself in the past and want more information. It is important to ensure that during this consultation confidentiality is not breached.

Patients with avoidant personality disorder tend to avoid social contact/relationships due to fear of being criticised, rejected or embarrassed. They view themselves as inferior to others and so are not keen to be involved unless they are certain of being liked. Hence this is not the correct answer.

Borderline personality disorder is characterised by emotional instability, impulsive behaviour and intense but unstable relationships with others. Patients often have feelings of emptiness, poor self-image and recurrent attempts at self-harm. Again making this an incorrect answer.

Narcissistic personality disorder is also incorrect. These patients have an over exaggerated perception of self-importance, lack empathy and tend to have a sense of entitlement.

Histrionic personality disorder is seen in patients who crave to be the centre of attention. They can also be sexually inappropriate and suggestible and as such, this is not the correct answer.



Discuss

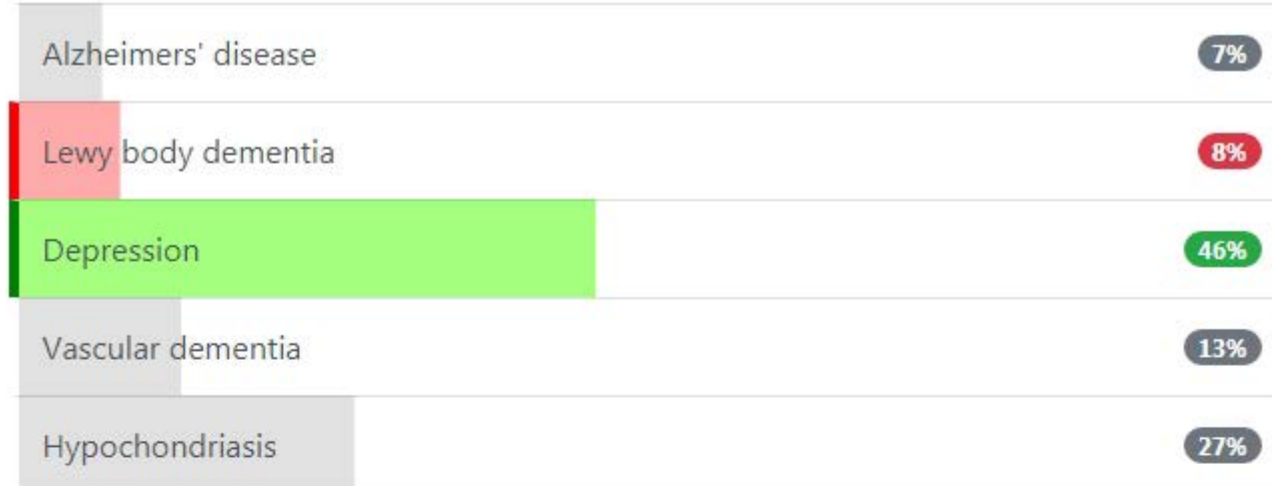
Improve

Dr Assem

A 84-year-old female attends clinic with her daughter. She has a past medical history of hypertension and a fractured neck of femur six months ago. Her daughter reports over the last few months she has become highly preoccupied with her blood pressure and diet measuring her blood pressure multiple times per day. Her daughter feels that her concerns over her physical health are affecting her mood. She becomes easily agitated and often snaps at her daughter. The patient denies any problems with her memory or mood but does report difficulty in getting to sleep.

What is the most likely diagnosis?

- ☐ Alzheimers' disease
- ☐ Lewy body dementia
- ☐ Depression
- ☐ Vascular dementia
- ☐ Hypochondriasis



Elderly patients with depression are less likely to complain of low mood and instead may present with health anxiety, agitation and sleep disturbance

Important for me Less important

Depression in elderly patients can be challenging to diagnose and less commonly presents with low mood or classical features of depression. Patients often present with health anxiety, poor sleep and agitation as in the question here making 3 the most correct answer. Her recent hip fracture and subsequent hospitalisation may have acted as a trigger of the low mood.

The patient does not report any memory problems and there is nothing else in the history to suggest significant memory impairment or Parkinson's like symptoms. Whilst vascular dementia can present with a change in personality there is no suggestion of altered executive function or confusion and hypertension is her only vascular risk factor. As such 1,2 and 4 are less likely than depression given the history. Memory problems should however be ruled out with a MMSE as patients will often not report concerns with their memory and depression can be associated with memory impairment.

There are features of health anxiety or hypochondriasis in this stem, however together with agitation and poor sleep, depression is a more likely answer.

A 84-year-old patient is brought to see you by his wife as she is worried about hallucinations he has been experiencing. She reports that he regularly sees cats walking around the house although they have never owned a cat. He is otherwise well in himself with no other concerns and does not seem troubled by the visions. He has a past medical history of hypertension, diabetes and cataracts and drinks approximately 20 units of alcohol per week.

What is the most likely diagnosis?

- ☐ Schizophrenia
- ☐ Parkinson's disease
- ☐ Alzheimer's disease
- ☐ Alcohol excess
- ☐ Charles-Bonnet Syndrome

Schizophrenia	6%
Parkinson's disease	4%
Alzheimer's disease	5%
Alcohol excess	8%
Charles-Bonnet Syndrome	77%

Patients with Charles-Bonnet syndrome experience persistent or recurrent complex visual or auditory hallucinations however generally have full insight into their condition

Important for me Less important

The correct answer is Charles-Bonnet Syndrome. This classically presents as recurrent visual or auditory hallucinations in patients with failing eyesight. It is thought that as the brain receives less visual stimulus than it is used to, it begins to fill in the gaps with previously stored images. Hallucinations can either be simple as in patterns or lines or complex as in people or animals. They are usually pleasant hallucinations and most patients retain insight. In this patient with a history of cataract Charles-Bonnet syndrome is most likely.

Whilst hallucinations can occur in both Alzheimer's Disease and Parkinson's Disease, there is nothing in the history to suggest any problems with memory or a tremor, making 2 and 4 unlikely. Likewise other than hallucinations there is no further evidence of schizophrenia in particular no 1st rank symptoms such as delusions, thought insertion, removal or broadcasting. Additionally patients with Alzheimer's tend to experience auditory as opposed to visual hallucinations.

Whilst 20 units of alcohol a week is over the revised recommend weekly intake it is unlikely significant enough to cause any serious medical complications. Furthermore there is nothing else in the history to suggest alcoholism as a cause of his symptoms.

--	--	--	--

Which one of the following symptoms may indicate mania rather than hypomania?

☐ Predominately elevated mood

☐ Delusions of grandeur

☐ Increased appetite

☐ Flight of ideas

☐ Irritability

Predominately elevated mood

10%

Delusions of grandeur

69%

Increased appetite

5%

Flight of ideas

11%

Irritability

5%

Whilst criteria vary (e.g. ICD-10, DSM-5) the consistent difference between mania and hypomania is the presence of psychotic symptoms.

A 24-year-old man tells you he is unable to go outside without first sanitizing the door handle in a certain way. He also washes his hands before and after he leaves the house. He goes on to explain that if he doesn't do these things in a certain order he gets very anxious and uptight.

This has been going on for two years and is upsetting him deeply.

What is the most appropriate treatment for the likely diagnosis?

- ☐ Eye Movement Desensitization and Reprocessing Therapy (EMDR)
- ☐ Trauma-focused CBT
- ☐ Olanzapine
- ☐ Dialectical behaviour therapy (DBT)
- ☐ Exposure-response prevention (ERP) therapy

Eye Movement Desensitization and Reprocessing Therapy (EMDR)	14%
Trauma-focused CBT	6%
Olanzapine	6%
Dialectical behaviour therapy (DBT)	19%
Exposure-response prevention (ERP) therapy	55%

An obsession is an intrusive, unpleasant and unwanted thought. A compulsion is a senseless action taken to reduce the anxiety caused by the obsession

Important for me Less important

This question requires you to identify the symptoms of Obsessive Compulsive Disorder (OCD) and know the best initial intervention.

Eye Movement Desensitization and Reprocessing Therapy (EMDR) - this is not the most appropriate answer. EMDR is used for patients suffering with Post-Traumatic Stress Disorder (PTSD)

Trauma-focused CBT - this is not the most appropriate answer. Trauma-focussed CBT is also used for patients suffering with Post-Traumatic Stress Disorder (PTSD)

Olanzapine - this is not the most appropriate answer. Olanzapine is an atypical antipsychotic medication and is not used first line to treat OCD.

Dialectical behaviour therapy (DBT) - this is not the most appropriate answer. DBT is a psychological intervention for patients with borderline personality disorder.

Exposure-response prevention (ERP) therapy - this is the correct answer. ERP therapy, as well as cognitive behavioural therapy, is recommended and a first line intervention for OCD.

You review a 55-year-old woman who has become dependant on temazepam, which was initially prescribed as a hypnotic. She is keen to end her addiction to temazepam and asks for help. Her current dose is 20mg on. What is the most appropriate strategy?

- Switch to the equivalent zopiclone dose then slowly withdraw over the next 2 weeks
- Switch to the equivalent diazepam dose then slowly withdraw over the next 2 weeks
- Switch to the equivalent zopiclone dose then slowly withdraw over the next 2 months
- Switch to the equivalent chlordiazepoxide dose then slowly withdraw over the next 2 months
- Switch to the equivalent diazepam dose then slowly withdraw over the next 2 months

Switch to the equivalent zopiclone dose then slowly withdraw over the next 2 weeks

8%

Switch to the equivalent diazepam dose then slowly withdraw over the next 2 weeks

19%

Switch to the equivalent zopiclone dose then slowly withdraw over the next 2 months

12%

Switch to the equivalent chlordiazepoxide dose then slowly withdraw over the next 2 months

11%

Switch to the equivalent diazepam dose then slowly withdraw over the next 2 months

50%

Which one of the following would cause a fall in the carbon monoxide transfer factor (TLCO)?

- ☐ Acute asthma
- ☐ Wegener's granulomatosis
- ☐ Polycythaemia
- ☐ Exercise
- ☐ Emphysema

Acute asthma

12%

Wegener's granulomatosis

12%

Polycythaemia

10%

Exercise

7%

Emphysema

59%

Transfer factor

- raised: asthma, haemorrhage, left-to-right shunts, polycythaemia
- low: everything else

Important for me Less important

A 33-year-old woman is prescribed varenicline to help her quit smoking. What is the mechanism of action of varenicline?

- ☐ Norepinephrine and dopamine reuptake inhibitor, and nicotinic antagonist
- ☐ Dopamine agonist
- ☐ Dopamine antagonist
- ☐ Selective serotonin reuptake inhibitor
- ☐ Nicotinic receptor partial agonist

Norepinephrine and dopamine reuptake inhibitor, and nicotinic antagonist

28%

Dopamine agonist

6%

Dopamine antagonist

6%

Selective serotonin reuptake inhibitor

6%

Nicotinic receptor partial agonist

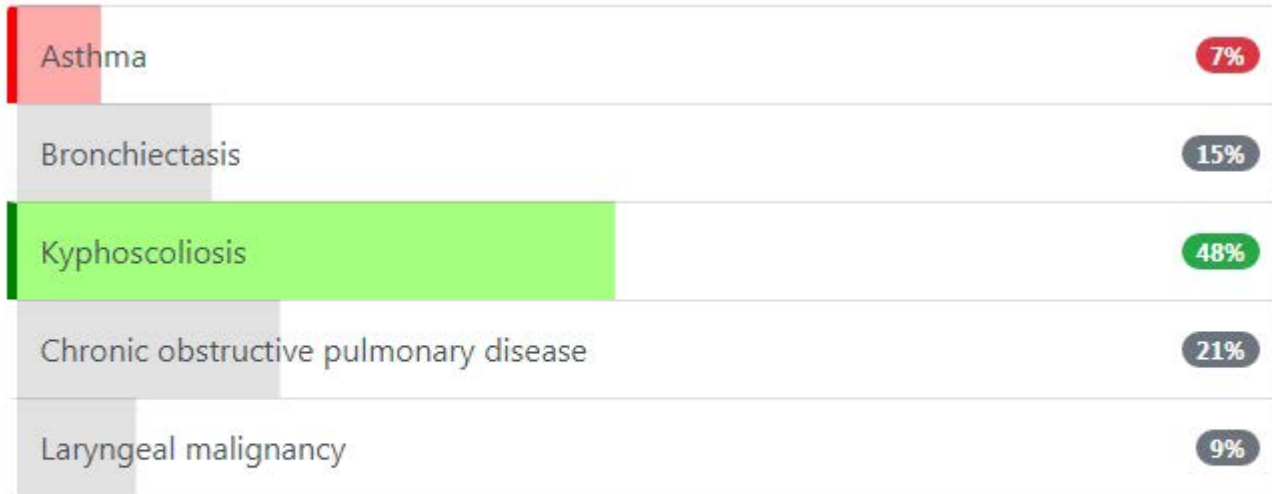
53%

You are reviewing the results from investigations requested at the previous respiratory clinic. A 40-year-old man is being investigated for increasing shortness of breath. The notes show he has smoked for the past 25 years. Pulmonary function tests reveal the following:

FEV1	1.4 L (predicted 3.8 L)
FVC	1.7 L (predicted 4.5 L)
FEV1/FVC	82% (normal > 75%)

Which one of the following is the most likely explanation?

- ☐ Asthma
- ☐ Bronchiectasis
- ☐ Kyphoscoliosis
- ☐ Chronic obstructive pulmonary disease
- ☐ Laryngeal malignancy



These results show a restrictive picture, which may result from a number of conditions including kyphoscoliosis. The other answers cause an obstructive picture.

Which one of the following is a contraindication to surgical resection in lung cancer?

- ☐ Haemoptysis
- ☐ FEV 1.9 litres
- ☐ Histology shows squamous cell cancer
- ☐ Vocal cord paralysis
- ☐ Calcium = 2.84 mmol/L

Haemoptysis

7%

FEV 1.9 litres

22%

Histology shows squamous cell cancer

9%

Vocal cord paralysis

51%

Calcium = 2.84 mmol/L

10%

Contraindications to lung cancer surgery include SVC obstruction, $FEV < 1.5$, MALIGNANT pleural effusion, and vocal cord paralysis

Important for me Less important

Paralysis of a vocal cord implies extracapsular spread to mediastinal nodes and is an indication of inoperability.

Dr Assem

A 27-year-old woman is reviewed in the asthma clinic. She currently uses salbutamol inhaler 100mcg prn combined with beclometasone dipropionate inhaler 400mcg bd. Despite this she is having frequent exacerbations of her asthma and recently required a course of prednisolone. What is the most appropriate next step in management?

- ☐ Add a leukotriene receptor antagonist
- ☐ Add tiotropium
- ☐ Add salmeterol
- ☐ Start to take the salbutamol regularly, 2 puffs qds
- ☐ Switch beclometasone to fluticasone

Add a leukotriene receptor antagonist

64%

Add tiotropium

6%

Add salmeterol

19%

Start to take the salbutamol regularly, 2 puffs qds

6%

Switch beclometasone to fluticasone

5%

Following NICE 2017, patients with asthma who are not controlled with a SABA + ICS should first have a LTRA added, not a LABA

Important for me Less important

A 79-year-old man is admitted with a right lower lobe pneumonia. As well as showing consolidation there also appears to be a moderate sized pleural effusion on the same side. An ultrasound guided pleural fluid aspiration is performed. The appearance of the fluid is clear and is sent off for culture. Whilst awaiting the culture results, which one of the following is the most important factor when determining whether a chest tube is placed?

- ☐ Glucose of the pleural fluid
- ☐ LDH of the pleural fluid
- ☐ pH of the pleural fluid
- ☐ Potassium of the pleural fluid
- ☐ Protein of the pleural fluid

Glucose of the pleural fluid	8%
LDH of the pleural fluid	15%
pH of the pleural fluid	52%
Potassium of the pleural fluid	5%
Protein of the pleural fluid	20%

The British Thoracic Society (BTS) state that the following are the main indications for placing a chest tube in pleural infection:

- *Patients with frankly purulent or turbid/cloudy pleural fluid on sampling should receive prompt pleural space chest tube drainage.*
- *The presence of organisms identified by Gram stain and/or culture from a non-purulent pleural fluid sample indicates that pleural infection is established and should lead to prompt chest tube drainage.*
- *Pleural fluid pH < 7.2 in patients with suspected pleural infection indicates a need for chest tube drainage.*

pH of the pleural fluid is therefore the most useful test of the options given.

A 29-year-old woman with a history of asthma presents for review. She has recently been discharged from hospital following an acute exacerbation and reports generally poor control with a persistent night time cough and exertional wheeze.

Her current asthma therapy is:

- salbutamol inhaler 100mcg prn
- Clenil (beclometasone dipropionate) inhaler 800mcg bd
- salmeterol 50mcg bd

She has a history of missing appointments and requests a medication with as few side-effects as possible. What is the most appropriate next step in management?

- ☐ Ipratropium inhaler
- ☐ Low-dose prednisolone
- ☐ Leukotriene receptor antagonist
- ☐ Modified-release theophylline
- ☐ Omalizumab

Ipratropium inhaler

6%

Low-dose prednisolone

5%

Leukotriene receptor antagonist

79%

Modified-release theophylline

5%

Omalizumab

4%

Following NICE 2017, patients with asthma who are not controlled with a SABA + ICS should first have a LTRA added, not a LABA

Important for me Less important

A 67-year-old female is referred to the acute medical unit with an infective exacerbation of COPD. Despite maximal medical therapy the arterial blood gases continue to show type II respiratory failure. You are asked to consider non-invasive ventilation. At what pH is the patient most likely to receive benefit from non-invasive ventilation?

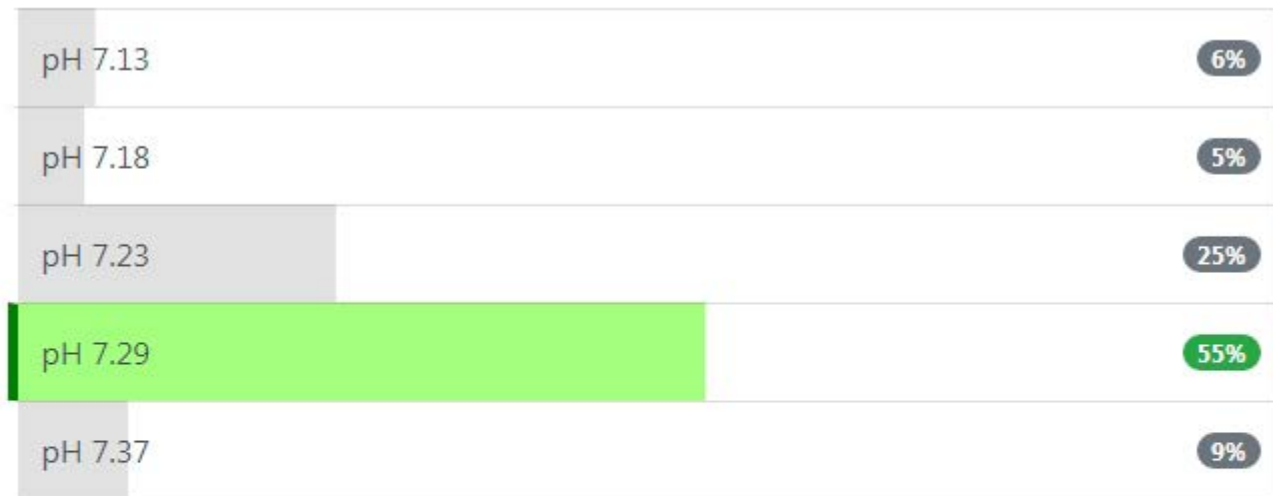
☐ pH 7.13

☐ pH 7.18

☐ pH 7.23

☐ pH 7.29

☐ pH 7.37



The evidence surrounding the use of NIV in COPD shows that patients with a pH in the range of 7.25-7.35 achieve the most benefit. If the pH is < 7.25 then invasive ventilation should be considered if appropriate

A 45-year-old man is noted to have bilateral hilar lymphadenopathy on chest x-ray. Which one of the following is the least likely cause?

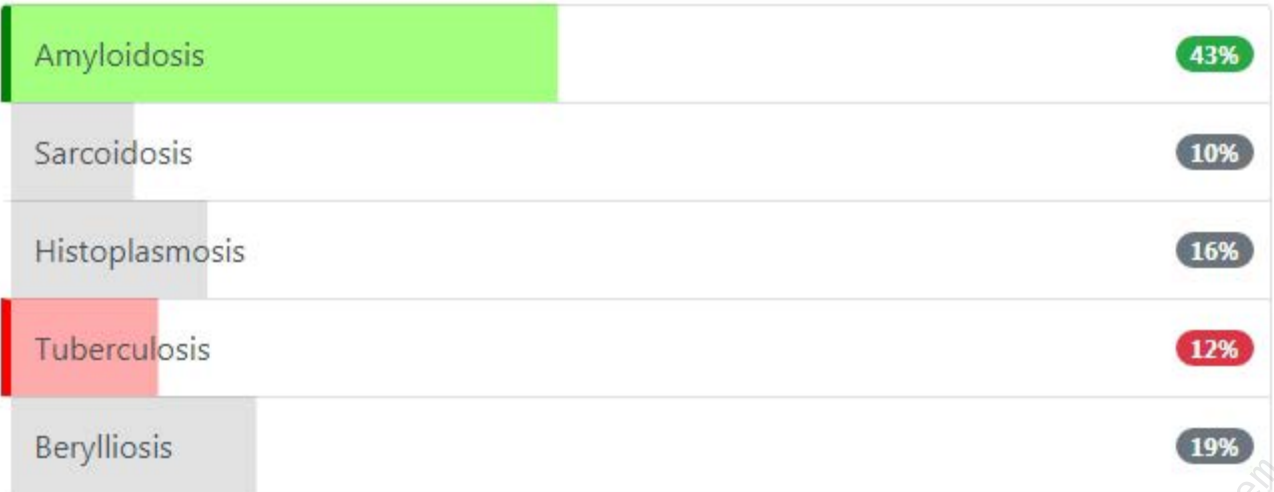
☐ Amyloidosis

☐ Sarcoidosis

☐ Histoplasmosis

☐ Tuberculosis

☐ Berylliosis



Condition	Percentage
Amyloidosis	43%
Sarcoidosis	10%
Histoplasmosis	16%
Tuberculosis	12%
Berylliosis	19%

Amyloidosis

43%

Sarcoidosis

10%

Histoplasmosis

16%

Tuberculosis

12%

Berylliosis

19%

Amyloidosis is not commonly associated with bilateral hilar lymphadenopathy

Dr Assem

A 60-year-old female with a history of COPD presents to the Emergency Department with shortness of breath. Blood pressure is 120/80 mmHg and her pulse is 90 bpm. The chest x-ray shows a pneumothorax with a 2.5 cm rim of air and no mediastinal shift.

What is the most appropriate management?

- ☐ Intercostal drain insertion
- ☐ Discharge
- ☐ Admit for 48 hours observation and repeat chest x-ray
- ☐ Immediate 14G cannula into 2nd intercostal space, mid-clavicular line
- ☐ Aspiration

Intercostal drain insertion

54%

Discharge

5%

Admit for 48 hours observation and repeat chest x-ray

8%

Immediate 14G cannula into 2nd intercostal space, mid-clavicular line

9%

Aspiration

24%

A preliminary diagnosis of extrinsic allergic alveolitis in a 55-year-old man. Which one of the following features would most support this diagnosis?

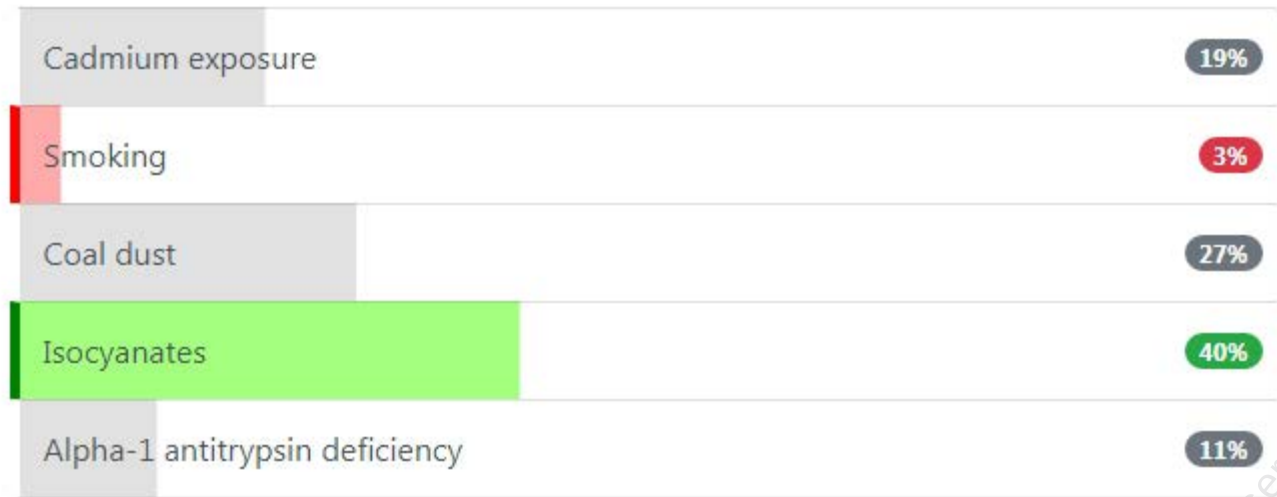
- ☐ Clubbing
- ☐ Eosinophilia
- ☐ Cyanosis
- ☐ Fibrosis in the upper zones
- ☐ History of working in the steel industry

Clubbing	7%
Eosinophilia	31%
Cyanosis	3%
Fibrosis in the upper zones	48%
History of working in the steel industry	11%

A history of working in the steel industry and eosinophilia are not features of extrinsic allergic alveolitis. Clubbing and cyanosis are non-specific

Which one of the following is least associated with the development of COPD?

- ☐ Cadmium exposure
- ☐ Smoking
- ☐ Coal dust
- ☐ Isocyanates
- ☐ Alpha-1 antitrypsin deficiency



Isocyanates are more associated with occupational asthma

You review a 26-year-old woman. She has a history of asthma and is prescribed salbutamol 100mcg 2 puffs prn, beclometasone dipropionate 400mcg bd and salmeterol 50mcg bd. Last week she found out she was pregnant and stopped the beclometasone and salmeterol inhalers as she was concerned about potential harm to the pregnancy. What is the most appropriate action?

- ☐ Reduce beclometasone to 200mcg bd and continue salmeterol at the same dose
- ☐ Stop beclometasone and salmeterol inhalers + refer to a respiratory physician
- ☐ Reduce beclometasone to 200mcg bd and stop salmeterol
- ☐ Restart beclomethasone at same dose and stop salmeterol
- ☐ Reassure + restart beclometasone and salmeterol inhalers

Reduce beclometasone to 200mcg bd and continue salmeterol at the same dose 7%

Stop beclometasone and salmeterol inhalers + refer to a respiratory physician 7%

Reduce beclometasone to 200mcg bd and stop salmeterol 6%

Restart beclomethasone at same dose and stop salmeterol 7%

Reassure + restart beclometasone and salmeterol inhalers 74%

Both the BNF and British Thoracic Society guidelines stress the need for good control of asthma during pregnancy. The BNF advises that 'inhaled drugs, theophylline and prednisolone can be taken as normal during pregnancy and breast-feeding'.

A 28-year-old girl wished to be tested for alpha 1 antitrypsin deficiency as her mother is suffering from the condition. She is a non-smoker and has no symptoms. She has been told she is unlikely to develop clinically significant symptoms, especially if continues to not smoke, but will be a carrier of the disease, what is her most likely genotype?

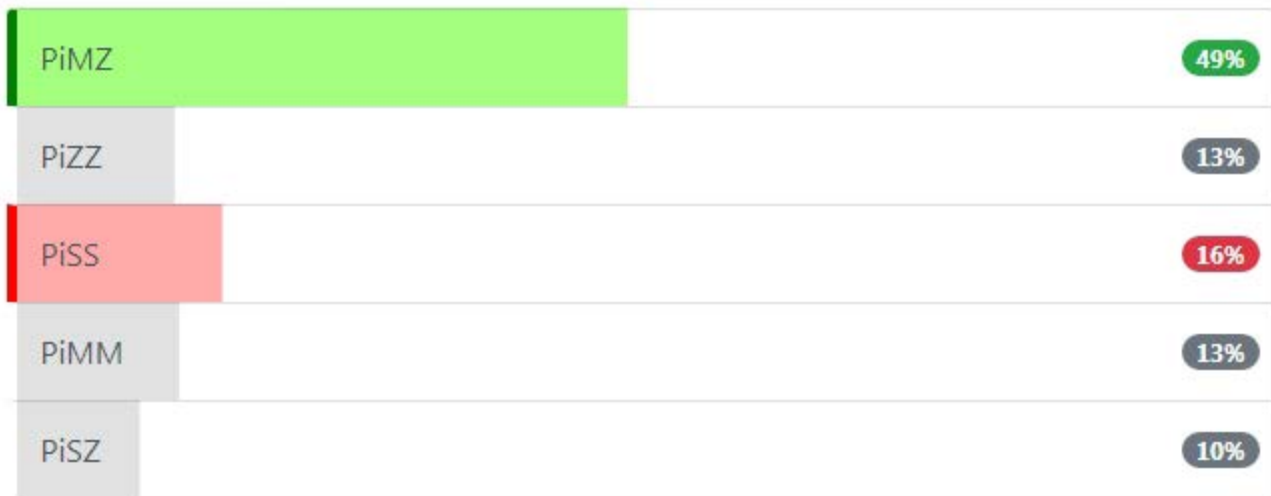
☐ PiMZ

☐ PiZZ

☐ PiSS

☐ PiMM

☐ PiSZ



The genotype MZ has one normal allele and one affected allele. Patients with this genotype would be unlikely to develop clinically significant symptoms but are at increased risk of lung and liver disease compared to the normal population and should avoid smoking. Patients with the genotype MM would have normal function and do not have an affected allele, therefore, are not carriers. The genotype ZZ will develop significant symptoms. Patients with genotype SS and SZ are at more risk of developing clinical symptoms over MZ as they have a more marked deficiency.

A 24-year-old man with asthma since childhood attended his regular appointment with his doctor. He plans to go on a hiking trip with his friends in one month and he wants to know if that will be safe for him. Which one of the following scenarios correctly describes the hemoglobin saturation of blood and the ability of body tissues to extract oxygen from the blood in response to various situations?

- If the hiking involves areas of relatively high altitude the hemoglobin saturation of blood after flowing through body tissues will be higher
- If the body tissues switch to anaerobic metabolism, body tissues will be able to extract less oxygen from the blood
- The physical exertion of hiking will have no effect on the hemoglobin saturation of the blood leaving body tissues
- If the man is not able to breathe properly and, his blood carbon dioxide level increases, this will cause his body tissues to extract more oxygen from his blood
- An increase in body temperature during the hiking will decrease the ability of the body to extract oxygen from the blood

If the hiking involves areas of relatively high altitude the hemoglobin saturation of blood after flowing through body tissues will be higher

20%

If the body tissues switch to anaerobic metabolism, body tissues will be able to extract less oxygen from the blood

14%

The physical exertion of hiking will have no effect on the hemoglobin saturation of the blood leaving body tissues

8%

If the man is not able to breathe properly and, his blood carbon dioxide level increases, this will cause his body tissues to extract more oxygen from his blood

48%

An increase in body temperature during the hiking will decrease the ability of the body to extract oxygen from the blood

10%

One of the main functions of the blood is for hemoglobin to bind to oxygen in the lungs and then deliver the oxygen to the body tissues. Hemoglobin is specifically adapted for this function and demonstrates positive cooperativity. This means that as oxygen bind to hemoglobin molecule, it increases the ability of the remaining hemoglobin molecules to bind oxygen. Several other parameters affect hemoglobin saturation, such as acidity, blood carbon dioxide levels and temperature amongst others.

1: At high altitudes, there is a right shift of the hemoglobin dissociation curve. This means that for the same partial pressure of oxygen, the hemoglobin saturation will be less.

2: Anaerobic metabolism will result in the production of lactic acid. Lactic acid will shift the hemoglobin saturation curve to the right and tissues will, therefore, be able to extract more oxygen from the blood, resulting in a lower hemoglobin saturation of the blood leaving the body tissues.

3: Physical activity is known to produce a right shift in the hemoglobin dissociation curve. Physical activity will also increase the body's temperature which also contributes to the right shift.

4: Carbon dioxide will produce a right shift in the hemoglobin dissociation curve and this will allow the body tissues to extract more oxygen from the blood, resulting in a lower hemoglobin saturation of the blood leaving the body tissues.

5: An increase in temperature is known to produce a right shift in the hemoglobin dissociation curve allowing more oxygen to be unloaded from the blood to the body tissues being supplied.

A 64-year-old woman with a background of asthma is referred to the respiratory clinic with worsening shortness of breath over the past few months. She was diagnosed with asthma when she was in her teens and currently takes an inhaled corticosteroid inhaler with an as required salbutamol inhaler which she rarely uses. She does not describe any wheeze or nocturnal symptoms and her inhaler technique in the clinic is excellent. She tells you that she is compliant with her medications. She has no other medical problems and is a non-smoker.

On examination, the patient is sitting comfortably at rest and talking in full sentences. Her oxygen saturations are 96% on air and her body mass index is 30 kg/m². Chest examination is clear.

As part of the work up the patient had a chest x-ray which shows a normal sized heart and clear lung fields. She has also had some lung function tests which show:

FEV1	3.30L (96.1%)
FVC	3.92L (88.6%)
FEV1/FVC	0.84
TLCO	77.4%
KCO	101.9%

What is the likely cause of the patient's shortness of breath?

☐ Obesity

☐ Acute exacerbation of asthma

☐ Pulmonary haemorrhage

☐ Pulmonary fibrosis

☐ Polycythaemia

Obesity	53%
Acute exacerbation of asthma	6%
Pulmonary haemorrhage	9%
Pulmonary fibrosis	22%
Polycythaemia	10%

Before attributing a patient's shortness of breath to their obesity we must ensure there are no other causes.

The patient's history suggests that her asthma is well controlled and she is compliant with her medication. The examination findings are also normal so it is very unlikely that the patient is having an exacerbation of her asthma. The time frame also goes against this as the patient has been having symptoms for several months.

Pulmonary fibrosis does give a restrictive picture on spirometry but would not give an increased KCO. Also, the normal chest x-ray does go against this.

Polycythaemia and pulmonary haemorrhage do give a raised KCO but the patient is too well for the diagnosis to be a pulmonary haemorrhage. These patients are often very unwell and have changes seen on chest x-ray. Polycythaemia per se should not cause shortness of breath.

A 24-year-old female presents with episodic wheezing and shortness of breath for the past 4 months. She has smoked for the past 8 years and has a history of eczema. Examination of her chest is unremarkable. Spirometry is arranged and is reported as normal.

What is the most appropriate next steps?

- ☐ Trial of a salbutamol inhaler
- ☐ Fractional exhaled nitric oxide + spirometry/bronchodilator reversibility test
- ☐ Baseline FEV1 repeated following inhaled corticosteroids
- ☐ Arrange a chest x-ray
- ☐ Trial of a salbutamol inhaler and low-dose inhaled corticosteroid

Trial of a salbutamol inhaler

20%

Fractional exhaled nitric oxide + spirometry/bronchodilator reversibility test

58%

Baseline FEV1 repeated following inhaled corticosteroids

6%

Arrange a chest x-ray

9%

Trial of a salbutamol inhaler and low-dose inhaled corticosteroid

7%

Adults with suspected asthma should have both a FeNO test and spirometry with reversibility

Important for me Less important

A 55-year-old man attends his GP with 7 day history of general fever and malaise, and a 2 day history of non-productive cough. His eyes have also been sticky and sore for the last few days. He appears visibly unwell, with a fever of 38.2°C and a respiratory rate of 20 /min. There is also some mild splenomegaly.

He has no history of recent foreign travel and denies any tuberculosis exposure or contact with anyone who has been ill. He is, however, the proud new owner of George, a red-crested Australian King Parrot, who he has had for a month.

What is the most likely cause of this gentleman's symptoms?

- ☐ H5N1 pneumonia
- ☐ *Chlamydia psittaci* infection
- ☐ *Mycoplasma* infection
- ☐ Acute hypersensitivity pneumonitis
- ☐ Cryptosporidiosis

H5N1 pneumonia		9%
<i>Chlamydia psittaci</i>	infection	62%
<i>Mycoplasma</i>	infection	6%
Acute hypersensitivity pneumonitis		16%
Cryptosporidiosis		6%

Chlamydia psittaci is a cause of pneumonia in bird keepers

Important for me Less important

This gentleman has acquired an atypical pneumonia caused by the gram-negative bacteria *Chlamydia psittaci*, a pathogen commonly found in domesticated and exotic birds. *C. psittaci* classically causes a respiratory infection as well as an acute or chronic conjunctivitis, but presentation can range from mild flu-like illness to multi-organ failure.

H5N1, also known as avian influenza or 'bird flu', has received significant attention given its high levels of pathogenicity, however, it does not transmit easily from birds to humans and cases have been limited to date to the far and middle east.

Mycoplasma is a more common cause of atypical pneumonia and would have a similar presentation. The bird keeping is the primary discriminating element here. Additionally, mycoplasma infection would not typically cause splenomegaly.

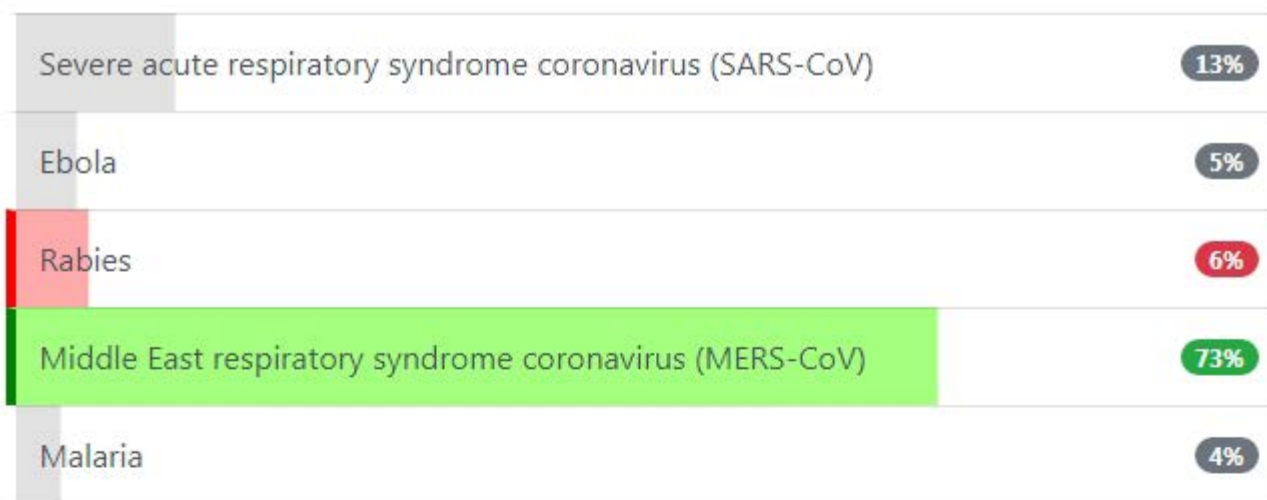
Hypersensitivity pneumonitis, also known as extrinsic allergic alveolitis, is a hypersensitivity reaction caused by exposure to organic dusts. This can include bird droppings, such as in Bird Fancier's Lung. Symptom onset is usually within 4-6 hours however as this is an allergic-type reaction, which does not fit with this clinical history.

Cryptosporidiosis is a parasitic infection that can be contracted from contact with infected individuals or animals. It is, however, an opportunistic infection and typically only presents in immunocompromised individuals, particularly those with HIV.

A 55-year-old diabetic patient has recently returned from pilgrimage from Saudi Arabia. He describes a respiratory illness comprised of cough, coryza and fever. He had had petted a dog and visited a camel farm whilst on his trip.

Which of the following diagnoses is most important to consider?

- ☐ Severe acute respiratory syndrome coronavirus (SARS-CoV)
- ☐ Ebola
- ☐ Rabies
- ☐ Middle East respiratory syndrome coronavirus (MERS-CoV)
- ☐ Malaria



Contact with camels (including camel products such as milk) is a significant risk factor for MERS-CoV

Important for me Less important

There have been outbreaks of MERS-CoV in the middle east, particularly centered around Saudi Arabia.

It is an airborne virus that can present with a flu-like illness and respiratory illness. The mortality is significant, hence clinicians should be alert to the possibility in patients presenting with these features and having returned from epidemic countries. It is particularly linked with camel contact.

Ebola is confined mainly to Sub-Saharan Africa.

The severe acute respiratory syndrome coronavirus (SARS-CoV) pandemic was centered around China. It was brought under control in 2003. There have been no outbreaks reported since 2004.

The risk of malaria is low from Saudi Arabia.

Saudi Arabia is a high-risk country for rabies. It is mainly spread through contact with saliva of an infected animal (usually via bite or scratch). There is nothing in the question however to denote potential exposure. Rabies cannot be transmitted from petting a dog unless there is contact with infected bodily animal fluid.

A 65-year-old woman is investigated for a 6 week history of worsening shortness of breath, lethargy and weight loss. Her past medical history includes chronic obstructive pulmonary disease, hypertension and she is an ex-smoker. Clinical examination is unremarkable. Investigation results are as follows:

Chest x-ray

Hyperinflated lung fields, normal heart size

Bloods

Sodium	131 mmol/l
Potassium	3.4 mmol/l
Urea	7.2 mmol/l
Creatinine	101 μ mol/l
Hb	10.4 g/dl
MCV	91 fl
Plt	$452 \times 10^9/l$
WBC	$3.7 \times 10^9/l$

What is the most appropriate management?

- ☐ Screen for depression
- ☐ Short synacthen test
- ☐ Urgent referral to the chest clinic
- ☐ Stop bendroflumethiazide
- ☐ Urgent gastroscopy



Despite a normal chest x-ray an ex-smoker with shortness of breath, weight loss and hyponatraemia should be investigated on an urgent basis for lung cancer. This approach is supported by current NICE guidelines. Whilst gastrointestinal cancer is a possibility the normal MCV is not entirely consistent with chronic blood loss

You review a 28-year-old woman with no past medical history of note. For the past week she has been experiencing left sided pleuritic chest pain. Her GP treated her for pleurisy with amoxicillin but there has been no improvement in her symptoms. She denies any shortness of breath and oxygen saturations on room air are 98%. A chest x-ray shows a 20% pneumothorax on the left side. What is the most appropriate management?

- ☐ Observe for 24 hours before discharging with standard advice
- ☐ Insert a chest drain
- ☐ Discharge with standard advice
- ☐ Aspiration
- ☐ Observe for 48 hours then repeat chest x-ray

Observe for 24 hours before discharging with standard advice

9%

Insert a chest drain

16%

Discharge with standard advice

32%

Aspiration

36%

Observe for 48 hours then repeat chest x-ray

7%

Questions sometimes discuss the size of the pneumothorax in percentage terms rather than giving the interpleural distance. A variety of formulas have been proposed to convert between the two.

As a very general rule of thumb:

Average interpleural distance	Approximate size of pneumothorax
0.5 cm	10%
1 cm	15 %
2 cm	30%
3 cm	45%
4 cm	60%

A pneumothorax of 20% is therefore within the 2 cm limit suggested by the British Thoracic Society for observation, if the patient is not short of breath.

A 43-year-old woman with a history of poorly controlled asthma is reviewed in the chest clinic. Tests showed an eosinophilia associated with a raised IgE level. Given the likely diagnosis of allergic bronchopulmonary aspergillosis, what is the most appropriate treatment to control her symptoms?

- ☐ Itraconazole
- ☐ Nebulised pentamidine
- ☐ Fluconazole
- ☐ Cyclophosphamide
- ☐ Prednisolone

Itraconazole

17%

Nebulised pentamidine

6%

Fluconazole

9%

Cyclophosphamide

5%

Prednisolone

64%

Dr. Arsem

A 41-year-old man presents to his doctor with a persistent cough. This has been present for the past six months and for the past two weeks he has been coughing up blood on a daily basis. He also feels more short-of-breath when exerting himself than normal. He is a non-smoker and has no past medical history of note. On examination he is noted to have reduced air entry in the right upper zone. A chest x-ray shows a right upper lobe collapse and a subsequent bronchoscopy demonstrates a cherry-red lesion in the right superior lobar bronchus. What is the most likely diagnosis?

- ☐ Small cell lung carcinoma
- ☐ Large cell lung carcinoma.
- ☐ Lung carcinoid
- ☐ Bronchioloalveolar carcinoma
- ☐ Bronchial adenocarcinoma



The 'cherry-red' lesion is a typical finding of lung carcinoid.

A 63-year-old man is noted to have a pleural effusion on CXR. Which one of the following would typically cause a transudate?

- ☐ Pancreatitis
- ☐ Pneumonia
- ☐ Yellow nail syndrome
- ☐ Hypothyroidism
- ☐ Dressler's syndrome

Pancreatitis

14%

Pneumonia

9%

Yellow nail syndrome

11%

Hypothyroidism

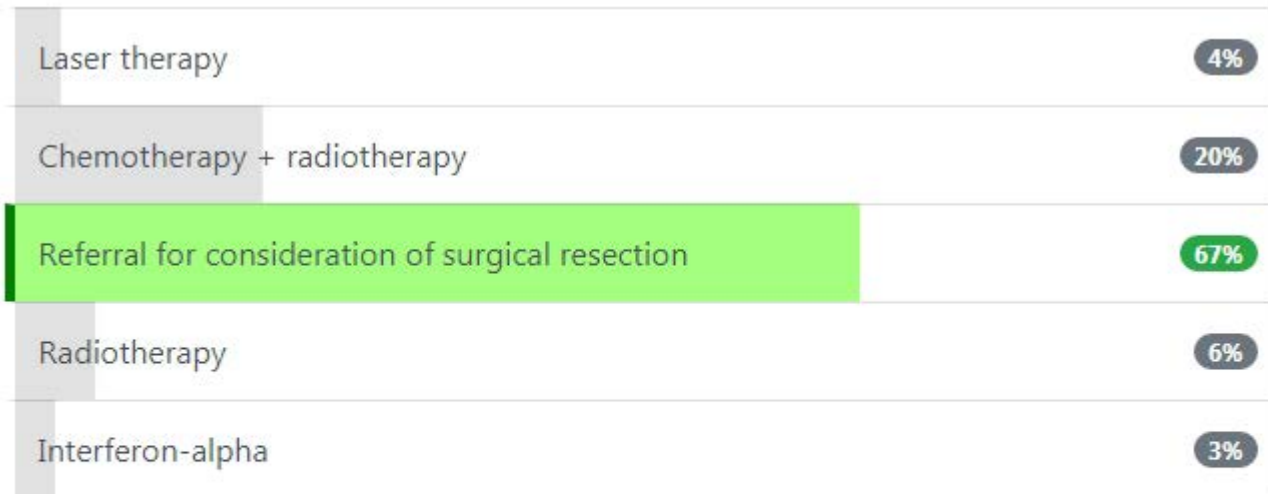
49%

Dressler's syndrome

18%

A 62-year-old female with a 40 pack year history of smoking is investigated for a chronic cough associated with haemoptysis. She has no past medical history of note and still works as a school secretary. Bronchoscopy reveals a small 1 cm tumour confined to the right main bronchus. A biopsy taken shows small cell lung cancer (SCLC). Extensive staging investigations show no evidence of nodal spread or metastases, giving a TNM grading of (T1, N0, M0). What is the most appropriate management?

- ☐ Laser therapy
- ☐ Chemotherapy + radiotherapy
- ☐ Referral for consideration of surgical resection
- ☐ Radiotherapy
- ☐ Interferon-alpha



Surgery still plays little role in the management of most patients with SCLC but recent studies, in addition to the NICE 2011 Lung cancer guidelines, support the role of surgery in very early stage disease.

Which of the following features is associated with a good prognosis in sarcoidosis?

- ☐ Insidious onset
- ☐ Splenomegaly
- ☐ Disease in black people
- ☐ Stage III features on CXR
- ☐ Erythema nodosum

Insidious onset

17%

Splenomegaly

6%

Disease in black people

13%

Stage III features on CXR

6%

Erythema nodosum

58%

Erythema nodosum is associated with a good prognosis in sarcoidosis

Important for me

Less important

Vital capacity may be defined as:

- ☐ Volume inspired or expired with each breath at rest
- ☐ Volume of air remaining after maximal expiration
- ☐ Maximum volume of air that can be inspired at the end of a normal tidal inspiration
- ☐ Maximum volume of air that can be expired at the end of a normal tidal expiration
- ☐ Maximum volume of air that can be expired after a maximal inspiration

Volume inspired or expired with each breath at rest

11%

Volume of air remaining after maximal expiration

6%

Maximum volume of air that can be inspired at the end of a normal tidal inspiration

15%

Maximum volume of air that can be expired at the end of a normal tidal expiration

10%

Maximum volume of air that can be expired after a maximal inspiration

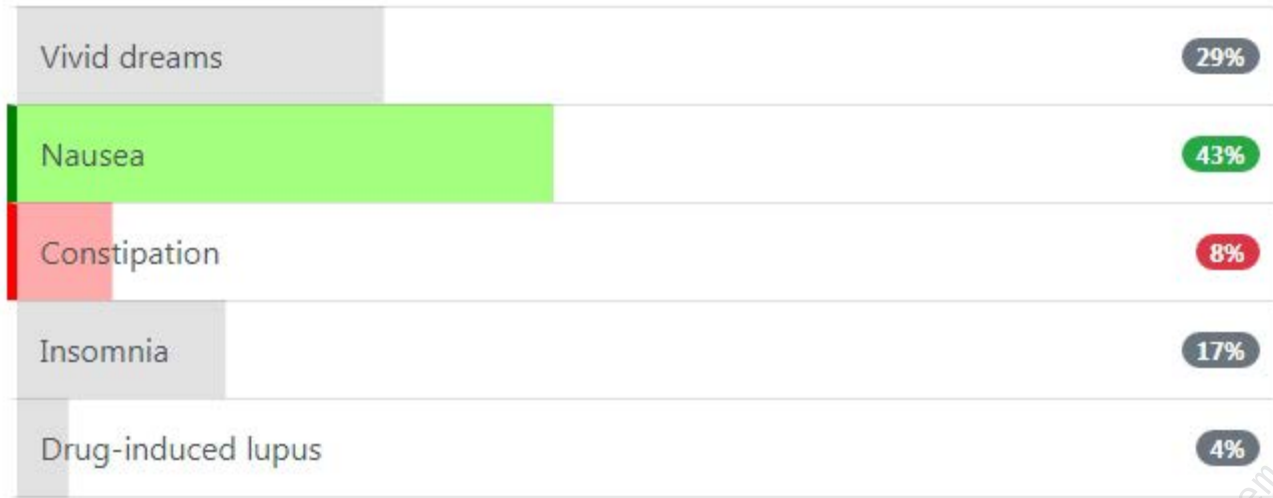
57%

Vital capacity - maximum volume of air that can be expired after a maximal inspiration

Important for me Less important

A 23-year-old female is commenced on varenicline to help her stop smoking. Which one of the following adverse effects is most likely to occur?

- ☐ Vivid dreams
- ☐ Nausea
- ☐ Constipation
- ☐ Insomnia
- ☐ Drug-induced lupus



Whilst all of the above adverse effects may occur nausea is the most common

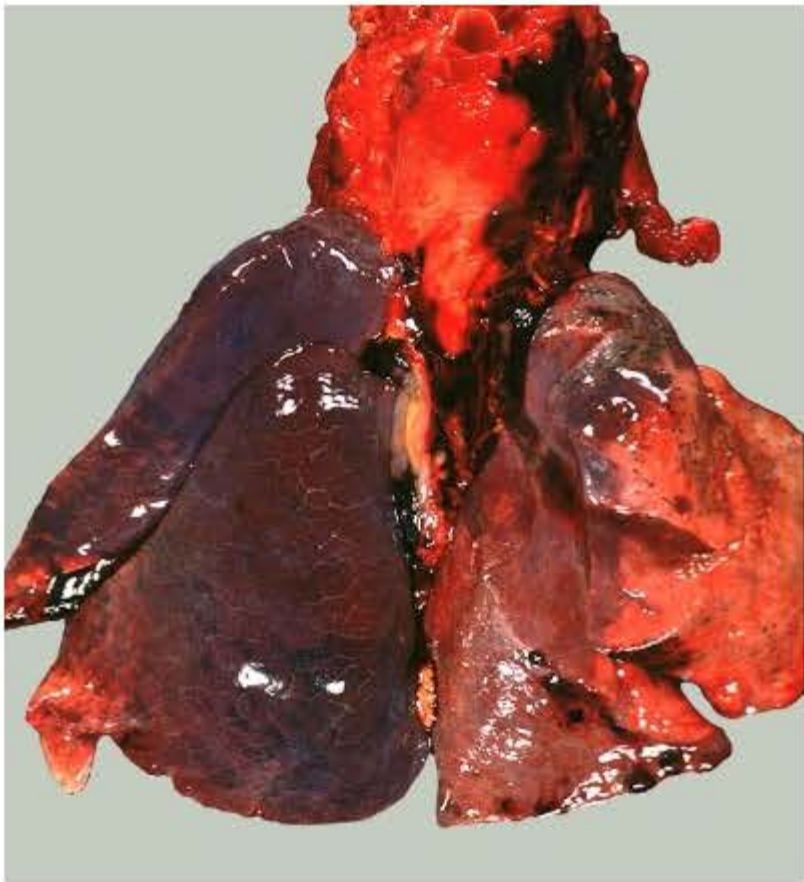
An 18-year-old male is brought to the hospital's trauma bay after emergency medical services were called to the scene of a motor vehicle accident, where his car collided with a tree. The patient's breath smells of alcohol. He has no significant past medical history. Physical examination reveals bruising on his chest and left shoulder. He is unresponsive to voice or painful stimuli, and is intubated, mechanically ventilated and given intravenous fluids. He weighs 75-kg. His vital signs are stable and initial arterial blood gas on his ventilator is as follows:

pH: 7.34, PaCO₂: 35 mmHg (4.6 kPa), PaO₂: 180 mmHg (24.0 kPa), HCO₃⁻: 24 mEq/L

Three days later, the nursing staff reports decreasing pulse oxygen saturation on the monitor, despite increasing the patient's FiO₂ to 0.8. Physical examination reveals coarse bilateral crackles. His vital signs on the monitor are: HR: 120, BP: 90/62 mmHg, SpO₂: 87%, Temp: 37.9C. Ventilator settings: Volume Control. Tidal Volume: 450mL, RR: 20 breaths/minute, FiO₂ 0.8, PEEP: 8 cmH₂O. A chest X-ray shows diffuse infiltrates, and the endotracheal tube is in an appropriate position. A Swan-Ganz catheter shows right pulmonary artery pressure of 28/10 mmHg and PCWP 12mmHg.

A repeat blood gas sample shows: pH: 7.25, PaCO₂: 45 mmHg (6.0 kPa), PaO₂: 60 mmHg (8.0 kPa), HCO₃⁻: 16 mEq/L

Despite best treatment efforts, the patient dies. Autopsy of the lung reveals the following:



© Image used on license from PathoPic

Which of the following mechanism is most likely responsible for the patient's ventilation and oxygenation deterioration?

- ☐ Fluid overload leading to left heart failure and pulmonary edema
- ☐ Barotrauma from inappropriate ventilator settings
- ☐ Neutrophil chemotaxis, and sloughing of alveolar endothelium
- ☐ Oxygen free radicals, leading to damage of the alveoli
- ☐ Segmental alveolar collapse from decreased expansion

Fluid overload leading to left heart failure and pulmonary edema	9%
Barotrauma from inappropriate ventilator settings	16%
Neutrophil chemotaxis, and sloughing of alveolar endothelium	40%
Oxygen free radicals, leading to damage of the alveoli	21%
Segmental alveolar collapse from decreased expansion	13%

The patient's history of a recent trauma, chest bruising, and delayed deterioration in ventilation and oxygenation suggests acute respiratory distress syndrome (ARDS) likely secondary to lung contusion from his trauma. The gross pathology specimen demonstrates diffuse hemorrhage. ARDS is a diagnosis of exclusion and can be caused by a variety of etiologies that include pneumonia, aspiration, inhalation injury, near drowning, pancreatitis, trauma, blood transfusion, amniotic embolism, and many others. The V/Q mismatch is primarily caused by non-cardiogenic pulmonary edema secondary to acute alveolar-capillary damage. There is generally a rapidly deteriorating respiratory distress leading to dyspnea, tachypnea, and hypoxemia. There are three main criteria that you should look for to support the diagnosis.

1. Bilateral lung opacities or "fluffy infiltrates" on the X-ray (less sensitive, and often delayed);
2. Evidence to distinguish from cardiogenic pulmonary edema (i.e. PCWP <18 mmHg) – with pressures in the left heart insufficient to cause backflow of blood upstream, leading to pulmonary edema (choice A); and 3. PaO₂/FiO₂ (P:F) ratio <300 (the lower the ratio, the worse the injury is). ARDS is a continuum, with the term Acute Lung Injury generally reserved for milder insufficiency and higher P:F ratios. A ratio <100 implies a very high FiO₂ (fraction of inspired oxygen that can range from 0.21 room air - to 1.0 pure oxygen delivery) achieving only a low oxygen tension in the blood, suggesting severe respiratory insufficiency. Delivering high FiO₂ can in fact cause free radical toxicity and atelectasis due to denitrogenation of the alveolus, but this requires a prolonged duration, not a few days (choice D)

In ARDS, there is a significant inflammatory response to injury in the lungs that typically occurs within one-week of an alveolar insult. Alveolar macrophages release chemotactic cytokines to neutrophils (choice C) such as IL-8. Neutrophils transmigrate into the alveoli through pulmonary capillaries. Capillary damage leads to leakage of protein-rich exudate fluids leading to the formation of hyaline membranes. Damage to type I pneumocytes leads to increasing thickness of the alveolar-capillary membrane and impaired gas exchange (pulmonary shunt). Damages to type II pneumocytes leads to impaired surfactant production, and decreased pulmonary compliance.

Although this places the patient at risk for barotrauma (low compliance leads to high ventilator pressures to deliver the set volume in volume control mode), research in the 1990's led to the development of the ARDSnet protocol of lung-protective ventilation. Ventilation with tidal volumes of 6-8mL/kg (choice B), balancing PEEP with FiO₂, and permitting moderate rises of PaCO₂ as a compromise for less aggressive ventilation has decreased morbidity and mortality from ventilator-associated lung injury. PEEP serves two functions - it leads to expansion of the alveolus which prevents atelectasis (choice E) which leads to improved oxygenation, and it prevents collapse and reinflation of the alveolus - which in the setting of impaired surfactant production can lead to "microtrauma" and worsening of the respiratory insufficiency. Treatment of ARDS is primarily supportive, and morbidity and mortality is high (40-50%).

Learning Objective: Acute Respiratory Distress Syndrome is a severe respiratory insufficiency that follows a variety of etiologies, including trauma. The underlying pathophysiology involves a severe inflammatory response in the lungs, sloughing of endothelium, leakage of protein-rich exudate into the alveolus, and surfactant deficiency.

A 34-year-old steelworker presents complaining of episodic shortness of breath. This is particularly noted whilst at work where he describes feeling wheezy and having a tendency to cough. Which one of the following is the most appropriate diagnostic investigation?

- ☐ Patch testing
- ☐ High resolution computed tomography of thorax
- ☐ Serial peak flow measurements at work and at home
- ☐ Specific IgE measurements
- ☐ Skin prick test

Patch testing

5%

High resolution computed tomography of thorax

11%

Serial peak flow measurements at work and at home

69%

Specific IgE measurements

8%

Skin prick test

7%

Serial peak flow measurements at work and at home are used to detect occupational asthma

Important for me Less important

A 24-year-old male is admitted with acute severe asthma. Treatment is initiated with 100% oxygen, nebulised salbutamol and ipratropium bromide nebulisers and IV hydrocortisone. Despite initial treatment there is no improvement. What is the next step in management?

- ☐ IV aminophylline
- ☐ IV magnesium sulphate
- ☐ IV salbutamol
- ☐ Non-invasive ventilation
- ☐ IV adrenaline

IV aminophylline

7%

IV magnesium sulphate

80%

IV salbutamol

4%

Non-invasive ventilation

7%

IV adrenaline

2%

Current guidelines do not support the routine use of non-invasive ventilation in asthmatics.

Which one of the following is responsible for malt workers' lung?

- ☐ *Aspergillus clavatus*
- ☐ Avian proteins
- ☐ *Mycobacterium avium*
- ☐ *Thermoactinomyces candidus*
- ☐ *Micropolyspora faeni*

Aspergillus clavatus

54%

Avian proteins

7%

Mycobacterium avium

7%

Thermoactinomyces candidus

17%

Micropolyspora faeni

15%

Aspergillus clavatus causes malt workers' lung, a type of EAA

Important for me Less important

Which one of the following would shift the oxygen dissociation curve to the right?

- ☐ Alkalosis
- ☐ HbF
- ☐ Low 2,3-DPG levels
- ☐ High $p\text{CO}_2$ levels
- ☐ Methaemoglobin

Alkalosis

14%

HbF

7%

Low 2,3-DPG levels

11%

High pCO₂ levels

58%

Methaemoglobin

10%

Oxygen dissociation curve

- shifts **Left** - **Lower** oxygen delivery - **Lower** acidity, temp, 2-3 DPG - also HbF, carboxy/methaemoglobin
- shifts **Right** - **Raised** oxygen delivery - **Raised** acidity, temp, 2-3 DPG

Important for me Less important

A 20-year-old man who has a family history of alpha-1 antitrypsin deficiency has genetic testing. The following results are received:

A1AT genotype

PiMZ

What is the most likely outcome?

- ☐ Weekly intravenous alpha1-antitrypsin protein concentrates in later life
- ☐ Mild emphysema controlled with bronchodilator therapy
- ☐ Death within 5-10 years
- ☐ Lung transplantation in later life
- ☐ No evidence of lung disease

Weekly intravenous alpha1-antitrypsin protein concentrates in later life	7%
Mild emphysema controlled with bronchodilator therapy	28%
Death within 5-10 years	3%
Lung transplantation in later life	7%
No evidence of lung disease	54%

Heterozygote patients such as those with the PiMZ genotype have alpha-1 antitrypsin levels approximately 35% of normal. They therefore have a low risk of developing clinically evident lung disease.

A chest x-ray of a patient with sarcoidosis shows bilateral hilar lymphadenopathy accompanied with interstitial infiltrates. What chest x-ray stage does this correspond to?

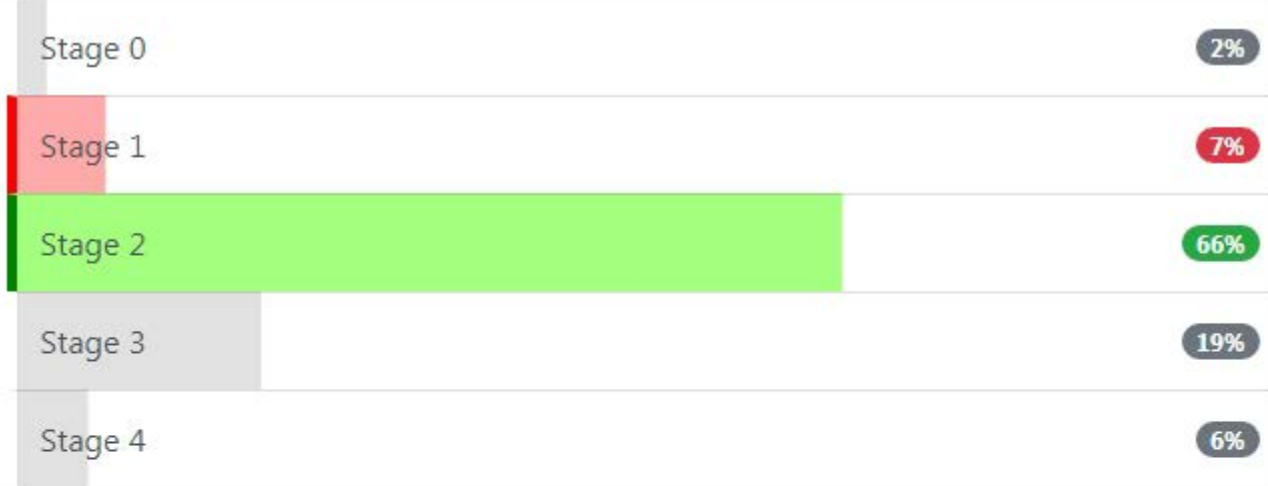
☐ Stage 0

☐ Stage 1

☐ Stage 2

☐ Stage 3

☐ Stage 4



Sarcoidosis CXR

- 1 = BHL
- 2 = BHL + infiltrates
- 3 = infiltrates
- 4 = fibrosis

Important for me Less important

A 74-year-old woman with thyroid cancer is admitted due to shortness of breath. What is the best investigation to assess for possible compression of the upper airways?

- ☐ Arterial blood gases
- ☐ Forced vital capacity
- ☐ Transfer factor
- ☐ Peak expiratory flow rate
- ☐ Flow volume loop

Arterial blood gases

4%

Forced vital capacity

13%

Transfer factor

6%

Peak expiratory flow rate

19%

Flow volume loop

58%

Flow volume loop is the investigation of choice for upper airway compression

Important for me Less important

A 24-year-old man who has developed a chronic cough and wheeze after starting a new job presents for review. His peak flow measurements are significantly reduced whilst at work and improve at the weekend. Which one of the following substances is most frequently associated with this kind of asthma?

- ☐ Cadmium
- ☐ Cement dust
- ☐ Diesel fumes
- ☐ Isocyanates
- ☐ Organophosphates (insecticides)

Cadmium

8%

Cement dust

10%

Diesel fumes

4%

Isocyanates

72%

Organophosphates (insecticides)

5%

Isocyanates are the most common cause of occupational asthma

Important for me

Less important

A 35-year-old female presents with shortness of breath. The following blood gases are obtained on room air:

pH	7.54
pCO ₂	1.8 kPa
pO ₂	12.4 kPa

Which one of the following should not be included on the list of differential diagnoses?

- ☐ Opiate overdose
- ☐ Pulmonary embolism
- ☐ Pregnancy
- ☐ Encephalitis
- ☐ Anxiety



The question asks for the least likely cause of a respiratory alkalosis. Salicylate, not opiate, poisoning is associated with a respiratory alkalosis. Opiate overdose would lead to respiratory depression and hence a respiratory acidosis

Which type of hypersensitivity reaction predominates in the acute phase of extrinsic allergic alveolitis?

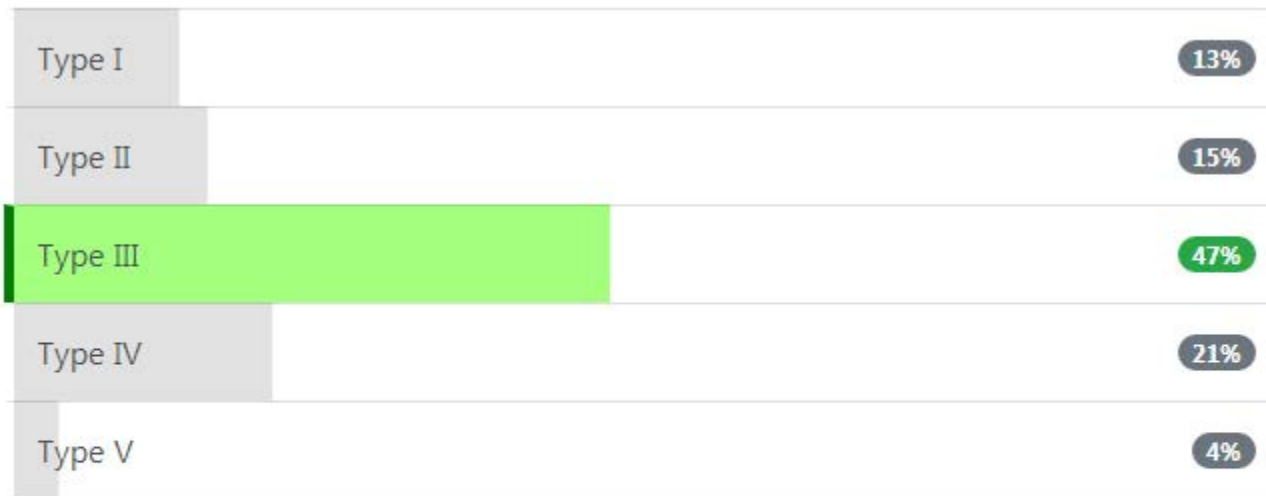
☐ Type I

☐ Type II

☐ Type III

☐ Type IV

☐ Type V



Although it is known that the pathogenesis of extrinsic allergic alveolitis involves a type IV (delayed) hypersensitivity reaction, a type III hypersensitivity reaction is thought to predominate, especially in the acute phase

A 55-year-old man is referred to the chest clinic by his general practitioner (GP). He initially presented to the GP 6 weeks ago with shortness of breath and an associated dry cough. He was also feverish and complained of malaise. The GP tried several courses of antibiotics but these did not help. There was no haemoptysis. He is previously fit and well and has never smoked. He works as an accountant. On examination, you note some inspiratory crackles on chest examination but otherwise, the examination is normal.

Blood tests that the GP previously did showed a leukocytosis and increased ESR and CRP. A chest x-ray shows patchy bilateral opacities. Some pulmonary function tests have also been arranged, which show an FEV1/FVC ratio of 0.65 with a transfer factor of 67%.

What is the most likely diagnosis?

- ☐ Cryptogenic organising pneumonia
- ☐ Hypersensitivity pneumoniitis
- ☐ Community acquired pneumonia
- ☐ Lung cancer
- ☐ Pulmonary haemorrhage

Cryptogenic organising pneumonia	54%
Hypersensitivity pneumoniitis	23%
Community acquired pneumonia	8%
Lung cancer	6%
Pulmonary haemorrhage	9%

The clinical story is suggestive of a cryptogenic organising pneumonia. The fact that clinches it is the lack of response to antibiotics. We would expect a community acquired pneumonia to respond to antibiotics.

Hypersensitivity pneumonitis is a possibility as the two conditions can have similar histories and chest x-ray appearances but there is no aetiological agent mentioned in the history so it makes it less likely.

Our patient is a non-smoker so lung cancer is less likely.

Pulmonary haemorrhage would give a raised transfer factor, not a reduced one.

Dr Assem

A 72-year-old man presents with gradually increasing shortness-of-breath on exertion over the past six months. He stopped smoking around 20 years ago and had a number of jobs including a builder and miner when he was younger. On auscultation of his chest fine crackles can be heard in both bases. Oxygen saturations are 95% on room air.

A number of tests are arranged:

- spirometry: normal
- chest x-ray: diffuse reticular shadowing suggestive of fibrosis affecting the lower zones. Heart size normal.

What is the most likely diagnosis?

- ☐ Extrinsic allergic alveolitis
- ☐ Histiocytosis
- ☐ Asbestosis
- ☐ Silicosis
- ☐ Coal worker's pneumoconiosis

Extrinsic allergic alveolitis	8%
Histiocytosis	3%
Asbestosis	53%
Silicosis	17%
Coal worker's pneumoconiosis	19%

Asbestosis causes pulmonary fibrosis predominantly affecting the lower zones

Important for me Less important

Asbestosis is the only one of the above diagnoses that predominately affects the lower zones. Cryptogenic fibrosing alveolitis is of course a differential diagnosis in this scenario.

A 45-year-old woman who is a known asthmatic comes for review. In the past two years she has had around six exacerbations of asthma requiring oral steroids. Her current medication includes salbutamol 2 puffs prn and beclometasone 200 mcg 1 puff bd. You note from the records that her BMI is 31 kg/m², she is a non-smoker and has a good inhaler technique. What is the most appropriate next step in management?

- ☐ Increase beclometasone to 200 mcg 2 puffs bd
- ☐ Referral to a dietician
- ☐ Add a long-acting beta-agonist
- ☐ Add oral montelukast
- ☐ Add inhaled tiotropium

Increase beclometasone to 200 mcg 2 puffs bd

13%

Referral to a dietician

9%

Add a long-acting beta-agonist

23%

Add oral montelukast

50%

Add inhaled tiotropium

6%

Following NICE 2017, patients with asthma who are not controlled with a SABA + ICS should first have a LTRA added, not a LABA

Important for me Less important

This patient is already taking a short-acting beta-agonist and a low-dose inhaled corticosteroid. Following NICE guidance she should, therefore, be offered an oral leukotriene receptor antagonist. Previous British Thoracic Society (BTS) guidance would advocate a long-acting beta-agonist in this situation.

Dr. Assem

You review a patient in the respiratory clinic who has a history of recurrent pulmonary embolism despite anticoagulation with warfarin. Which one of the following physiological changes would be expected?

- ☐ Increased lung compliance
- ☐ Reduced TLCO
- ☐ Reduced forced vital capacity
- ☐ Reduced FEV1
- ☐ Increased FEV1 / FVC ratio

Increased lung compliance

7%

Reduced TLCO

73%

Reduced forced vital capacity

7%

Reduced FEV1

6%

Increased FEV1 / FVC ratio

7%

Which of the following factors is least useful in assessing patients with a poor prognosis in community-acquired pneumonia?

- ☐ Abbreviated Mental Test Score (AMTS) of 6/10
- ☐ Urea of 11.4 mmol/l
- ☐ C-reactive protein of 154
- ☐ Respiratory rate of 30
- ☐ Aged 75 years old

Abbreviated Mental Test Score (AMTS) of 6/10	14%
Urea of 11.4 mmol/l	11%
C-reactive protein of 154	54%
Respiratory rate of 30	10%
Aged 75 years old	10%

The C-reactive protein is the least useful of the above in predicting mortality in patients with community-acquired pneumonia. The rest of the answers are part of the CURB-65 criteria

A 57-year-old gentleman presents with a chronic, recurrent cough, expiratory wheeze and increased exertional breathlessness. He has never smoked and very limited exposure to passive smoking. He has no significant occupational exposure to pollutants or irritants. Spirometry demonstrates an obstructive picture with limited bronchodilator reversibility. He is suspected of having alpha1-antitrypsin deficiency. What is alpha1-antitrypsin?

- ☐ Cytokine inhibitor
- ☐ Co-factor for surfactant protein
- ☐ Protease inhibitor of neutrophil elastase
- ☐ Goblet cell cytokine
- ☐ Immunoglobulin

Cytokine inhibitor	2%
Co-factor for surfactant protein	6%
Protease inhibitor of neutrophil elastase	88%
Goblet cell cytokine	2%
Immunoglobulin	2%

The correct answer is protease inhibitor of neutrophil elastase. Alpha1-antitrypsin is produced by the liver and by inhibiting neutrophil elastase helps protect the lungs against the functions of this enzyme. Deficiency can cause emphysema and cirrhosis.

Which one of the following is the main criteria for determining whether a patient with chronic obstructive pulmonary disease (COPD) should be offered long-term oxygen therapy?

- ☐ Two arterial blood gases measurements with $pO_2 < 6.3$ kPa
- ☐ One arterial blood gas measurement with $pO_2 < 7.7$ kPa
- ☐ One arterial blood gas measurement with $pO_2 < 8.3$ kPa
- ☐ One arterial blood gas measurement with $pO_2 < 8.0$ kPa
- ☐ Two arterial blood gases measurements with $pO_2 < 7.3$ kPa

Two arterial blood gases measurements with $pO_2 < 6.3$ kPa

15%

One arterial blood gas measurement with $pO_2 < 7.7$ kPa

8%

One arterial blood gas measurement with $pO_2 < 8.3$ kPa

6%

One arterial blood gas measurement with $pO_2 < 8.0$ kPa

8%

Two arterial blood gases measurements with $pO_2 < 7.3$ kPa

63%

COPD - LTOT if 2 measurements of $pO_2 < 7.3$ kPa

Important for me Less important

A 69-year-old man presents to his general practitioner with a cough that has been present for 4 weeks and hasn't improved despite several courses of antibiotics. He has no other symptoms. There is no significant medical history and he has never smoked. The patient is currently retired but worked as an accountant for all his working life. The examination is unremarkable.

A chest x-ray is arranged which shows an area of opacification in the right upper zone. The patient then goes on to have a CT scan of his chest and abdomen. It is reported as showing a lung mass in the right upper lobe suspicious of a lung cancer. There are no other abnormalities reported.

When you see the patient in the two-week wait clinic you break the news to him and inform him that the next step will be to try to obtain a tissue diagnosis.

What is the likely histology of the lung cancer?

☐ Adenocarcinoma
☐ Squamous cell
☐ Alveolar cell
☐ Small cell
☐ Mesothelioma

Dr Assem

Adenocarcinoma	60%
Squamous cell	17%
Alveolar cell	5%
Small cell	13%
Mesothelioma	5%

The correct answer is adenocarcinoma. This is a type of cancer that is not necessarily associated with smoking and as our patient is a non-smoker this is the most likely answer. Lung adenocarcinomas can present as primary lung cancers or as secondaries from adenocarcinomas elsewhere in the body.

Squamous cell lung cancers are strongly associated with smoking and therefore very unlikely in our patient. They can cavitate and sometimes appear as cavitating lesions on chest x-ray. In addition, they are associated with hypercalcemia.

Alveolar cell carcinomas are rare and usually present with a productive cough with copious sputum and fluffy infiltrates on chest x-ray.

Small cell carcinomas account for about 20% of lung cancers. They are the most aggressive type of lung cancer and have usually metastasized by the time of diagnosis. The CT report for our patient does not suggest any metastases. Because of this surgery is very rarely an option but they can be very chemosensitive. They are also associated with hyponatraemia.

Mesothelioma is associated with exposure to asbestos. There is no suggestion of this in the history.

Which one of the following interventions is most likely to increase survival in patients with COPD?

- ☐ Home nebulisers
- ☐ Tiotropium inhaler
- ☐ Long-term steroid therapy
- ☐ Smoking cessation
- ☐ Long-term oxygen therapy



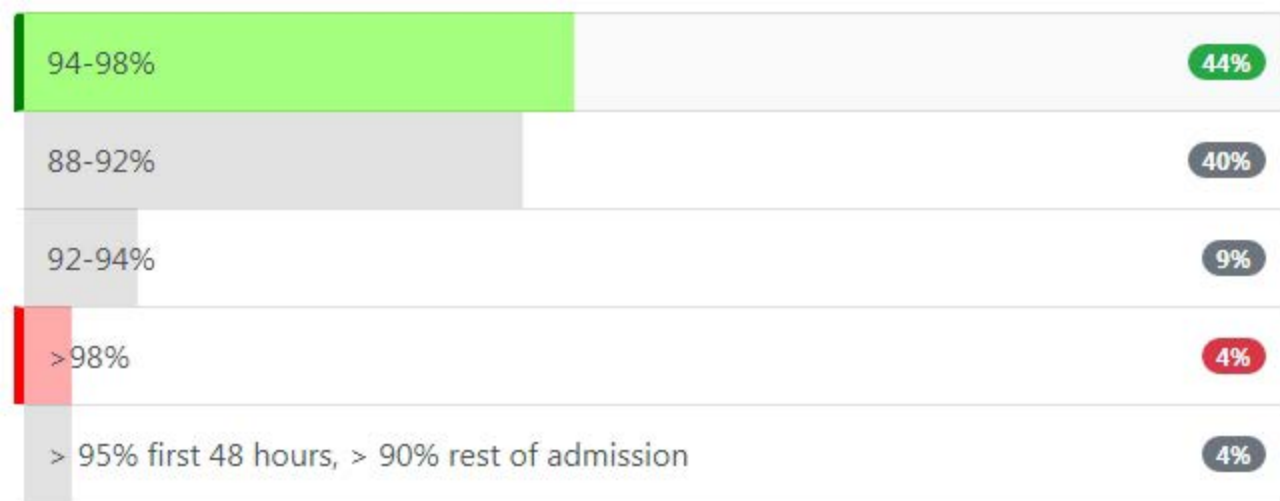
Whilst long-term oxygen therapy may increase survival in hypoxic patients, smoking cessation is the single most important intervention in patients with COPD

A 65-year-old woman with a history of chronic obstructive pulmonary disease (COPD) is admitted to the Emergency Department with breathlessness. This is her first admission with an exacerbation of COPD. Blood gases taken on room air shortly after admission are as follows:

pH	7.38
pCO ₂	4.9 kPa
pO ₂	8.8 kPa

What should her target oxygen saturations be?

- ☐ 94-98%
- ☐ 88-92%
- ☐ 92-94%
- ☐ >98%
- ☐ > 95% first 48 hours, > 90% rest of admission



When managing patients with COPD, once the pCO₂ is known to be normal the target oxygen saturations should be 94-98%.

A 38-year-old man is reviewed in the respiratory clinic complaining of episodic wheezing whilst playing rugby. There is no history of cough, atopy or smoking. He is generally fit and well and has no past medical history of note. Clinical examination is unremarkable.

Which of the following should be arranged to investigate his symptoms?

- ☐ Fractional exhaled nitric oxide + spirometry/bronchodilator reversibility test
- ☐ Chest x-ray
- ☐ Spirometry + bronchodilator reversibility test
- ☐ Methacholine stimulation test
- ☐ A trial of inhaled corticosteroids with FEV1 measurements before and after

Fractional exhaled nitric oxide + spirometry/bronchodilator reversibility test

66%

Chest x-ray

4%

Spirometry + bronchodilator reversibility test

18%

Methacholine stimulation test

6%

A trial of inhaled corticosteroids with FEV1 measurements before and after

5%

Adults with suspected asthma should have both a FeNO test and spirometry with reversibility

Important for me Less important

You are the team doctor with a mountaineering expedition. The group have ascended to a height of 5000m and have set up a forward camp. One mountaineer complains of a headache and nausea that she had initially dismissed as she was keen to make the summit but have been getting worse. The headache is now very severe and other climbers become concerned when she is seen to stagger about the camp. When you see her she confirms that she has a severe headache and is feeling unsteady on her feet. You note that her gait is ataxic.

What is the recommended management of this patient?

- ☐ Descent
- ☐ Descent + acetazolamide
- ☐ Descent + dexamethasone
- ☐ Descent + phosphodiesterase type V inhibitor
- ☐ Oxygen

Descent	5%
Descent + acetazolamide	22%
Descent + dexamethasone	60%
Descent + phosphodiesterase type V inhibitor	4%
Oxygen	9%

Management of high altitude cerebral edema (HACE) is with descent + dexamethasone

Important for me Less important

This patient has features of high-altitude cerebral oedema (HACE) which is likely to have progressed from acute mountain sickness (AMS). She is complaining of a severe headache and has developed gait ataxia. Papilloedema is also a feature of HACE but realistically this would be difficult to identify on the mountainside. The symptoms alone are sufficient to raise alarm about HACE and necessitate treatment.

The management of HACE is descent and dexamethasone.

1. Incorrect. Descent alone is insufficient if cerebral oedema has already developed. To reduce swelling a potent glucocorticoid such as dexamethasone is required.
2. Incorrect. Again, though descent is crucial, acetazolamide is not an appropriate treatment for HACE. This would be an effective treatment for high-altitude pulmonary oedema (HAPE)
3. Correct. The gold-standard management of HACE is descent + dexamethasone.
4. Incorrect. This is a treatment for HAPE
5. Incorrect. Supplementary oxygen is often given but just giving oxygen alone without descent or dexamethasone would not be appropriate.

A 56-year-old man is admitted with type II respiratory failure secondary to COPD but fails to respond to maximal medical therapy. It is decided that a trial of non-invasive ventilation in the form of bi-level pressure support should be given. What are the most appropriate initial settings for the ventilator?

- ☐ IPAP = 10 cm H₂O; EPAP = 5 cm H₂O
- ☐ IPAP = 15 cm H₂O; EPAP = 15 cm H₂O
- ☐ IPAP = 50 cm H₂O; EPAP = 20 cm H₂O
- ☐ IPAP = 20 cm H₂O; EPAP = 50 cm H₂O
- ☐ IPAP = 5 cm H₂O; EPAP = 12 cm H₂O

IPAP = 10 cm H₂O; EPAP = 5 cm H₂O

59%

IPAP = 15 cm H₂O; EPAP = 15 cm H₂

8%

IPAP = 50 cm H₂O; EPAP = 20 cm H₂O

7%

IPAP = 20 cm H₂O; EPAP = 50 cm H₂O

7%

IPAP = 5 cm H₂O; EPAP = 12 cm H₂O

19%

The 2008 Royal College of Physicians guidelines recommend an initial IPAP of 10 cm H₂O. The 2002 British Thoracic Society guidelines had previously advocated starting at 12-15 cm H₂O

Non-invasive ventilation (NIV) is least likely to be successful in which one of the following scenarios?

- ☐ COPD
- ☐ Chest wall deformity
- ☐ Obstructive sleep apnoea
- ☐ Weaning from tracheal intubation
- ☐ Bronchiectasis

COPD

5%

Chest wall deformity

26%

Obstructive sleep apnoea

10%

Weaning from tracheal intubation

7%

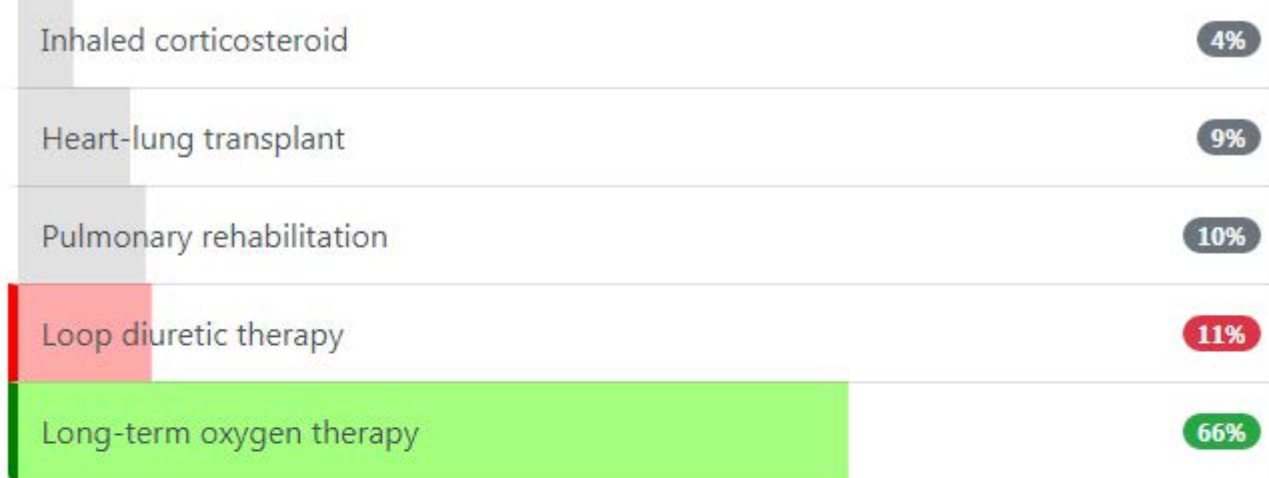
Bronchiectasis

52%

The British Thoracic Society recommend that whilst a trial of NIV may be undertaken in bronchiectasis it should not be used routinely as its effectiveness is likely to be limited by excessive secretions

You review a 67-year-old man who has chronic obstructive pulmonary disease (COPD). On examination there is evidence of cor pulmonale with a significant degree of pedal oedema. His FEV1 is 43%. During a recent hospital stay his pO2 on room air was 7.5 kPa. Which one of the following interventions is most likely to increase survival in this patient?

- ☐ Inhaled corticosteroid
- ☐ Heart-lung transplant
- ☐ Pulmonary rehabilitation
- ☐ Loop diuretic therapy
- ☐ Long-term oxygen therapy



After smoking cessation, long-term oxygen therapy (LTOT) is one of the few interventions that has been shown to improve survival in COPD.

LTOT should be offered to patients with a pO_2 of < 7.3 kPa or to those with a pO_2 of $7.3 - 8$ kPa and one of the following:

- secondary polycythaemia
- nocturnal hypoxaemia
- peripheral oedema
- pulmonary hypertension

Which one of the following is least associated with bronchiectasis?

- ☐ Hypogammaglobulinaemia
- ☐ Allergic bronchopulmonary aspergillosis
- ☐ Measles
- ☐ Cystic fibrosis
- ☐ Sarcoidosis

Hypogammaglobulinaemia

10%

Allergic bronchopulmonary aspergillosis

9%

Measles

34%

Cystic fibrosis

4%

Sarcoidosis

44%

Traction bronchiectasis may be seen in some rare cases of stage IV pulmonary sarcoidosis but this is the least strong association of the five options

You are seeing a patient whom you suspect may have chronic obstructive pulmonary disease (COPD). Which one of the following points/investigation is least relevant?

- ☐ Smoking history
- ☐ Chest x-ray
- ☐ Full blood count
- ☐ Peak expiratory flow
- ☐ Spirometry

Smoking history

4%

Chest x-ray

8%

Full blood count

24%

Peak expiratory flow

53%

Spirometry

12%

Peak expiratory flow is of no value in the diagnosis of COPD

Dr Assef

A 60-year-old presents with a persistent cough, haemoptysis and weight loss with an abnormal chest x-ray. A subsequent CT scan and biopsy confirm squamous cell lung cancer. You order some blood tests which the following:

Hb	90 g/L	Male: (135-180)
----	--------	-----------------

Na ⁺	140 mmol/L	(135 - 145)
K ⁺	3.7 mmol/L	(3.5 - 5.0)
Urea	5 mmol/L	(2.0 - 7.0)
Creatinine	110 µmol/L	(55 - 120)

Calcium	3.2 mmol/L	(2.1-2.6)
Phosphate	0.4 mmol/L	(0.8-1.4)
Thyroid stimulating hormone (TSH)	5.5 mU/L	(0.5-5.5)
Free thyroxine (T4)	15 pmol/L	(9.0 - 18)

You order a parathyroid hormone (PTH) level which is low. She denies any bony pain.

What is the likely cause of her hypercalcaemia?

- ☐ Renal failure
- ☐ Bony metastases
- ☐ Secretion of parathyroid hormone related peptide (PTHrP)
- ☐ Secretion of thyroid stimulating hormone (TSH)
- ☐ Secretion of adrenocorticotrophic hormone (ACTH)

Renal failure	3%
Bony metastases	12%
Secretion of parathyroid hormone related peptide (PTHrP)	73%
Secretion of thyroid stimulating hormone (TSH)	3%
Secretion of adrenocorticotrophic hormone (ACTH)	8%

PTHrP is a paraneoplastic syndrome associated with squamous cell lung cancer

Important for me Less important

It's important to remember paraneoplastic syndromes associated with lung cancers. Squamous cell lung cancer can secrete PTHrP which mimics PTH and causes calcium resorption which is not under negative feedback. PTHrP cannot be measured by enzyme assays hence a normal PTH level. And so the excess calcium negatively inhibits the release of PTH and thus levels will be low.

Renal function and thyroid function tests are normal thus options 1 and 4 can be dismissed. In addition ACTH is usually a feature of small cell lung cancer thus option 5 is incorrect. Lung cancer can metastasize to bone, however, the patient is not complaining of bony pain and thus unlikely in this scenario.

You review a 27-year-old woman in the Emergency Department who has been admitted with an acute exacerbation of her asthma. Which one of the following features is most likely to indicate a life-threatening attack?

- ☐ Failure to improve after nebulised salbutamol 5mg
- ☐ Cannot complete sentences
- ☐ Oxygen saturations of 94% on room air
- ☐ Peak flow of 30% best or predicted
- ☐ Respiratory rate of 42 / min

Failure to improve after nebulised salbutamol 5mg

5%

Cannot complete sentences

19%

Oxygen saturations of 94% on room air

5%

Peak flow of 30% best or predicted

51%

Respiratory rate of 42 / min

19%

A 30-year-old woman is admitted to the Emergency Department with an exacerbation of asthma. On arrival her peak flow is 30% of predicted, respiratory rate is 36/min and oxygen saturations are 98% on 100% high-flow oxygen. She is given back-to-back nebulisers, intravenous hydrocortisone and started on a magnesium infusion. Which one of the following would be the strongest indicator of a need for intubation and ventilation?

- ☐ PEFR 35% of predicted
- ☐ pH 7.33
- ☐ Patient preference after informed consent
- ☐ Respiratory rate of 50 / min
- ☐ Oxygen saturations of 95% on 100% high-flow oxygen

PEFR 35% of predicted	18%
pH 7.33	46%
Patient preference after informed consent	4%
Respiratory rate of 50 / min	25%
Oxygen saturations of 95% on 100% high-flow oxygen	8%

A pH less than 7.35 likely represents carbon dioxide retention in a tiring patient and is an ominous sign in acute asthma. Performing serial peak flows in a patient with life-threatening asthma is neither practical nor desirable.

You are reviewing a patient with chronic obstructive pulmonary disease (COPD) who remains breathless despite using a salbutamol inhaler as required. Their FEV1 is 60%. There is no history of asthma, eosinophilia or FEV1 variation.

What is the most appropriate next step?

- ☐ Long-acting beta2-agonist (LABA) **or** inhaled corticosteroid
- ☐ Long-acting muscarinic antagonist (LAMA) + inhaled corticosteroid (ICS) in a combination inhaler **or** long-acting beta2-agonist (LABA)
- ☐ Long-acting beta2-agonist (LABA) **or** LABA + inhaled corticosteroid (ICS) in a combination inhaler
- ☐ Long-acting beta2-agonist (LABA) **or** regular combined short-acting beta2-agonist + muscarinic antagonist (e.g. Combivent)
- ☐ Combined long acting beta agonist and long acting muscarinic antagonist (LABA/LAMA)

Long-acting beta2-agonist (LABA)	or	inhaled corticosteroid	10%
Long-acting muscarinic antagonist (LAMA) + inhaled corticosteroid (ICS) in a combination inhaler	or	long-acting beta2-agonist (LABA)	11%
Long-acting beta2-agonist (LABA)	or	LABA + inhaled corticosteroid (ICS) in a combination inhaler	10%
Long-acting beta2-agonist (LABA)	or	regular combined short-acting beta2-agonist + muscarinic antagonist (e.g. Combivent)	11%
Combined long acting beta agonist and long acting muscarinic antagonist (LABA/LAMA)			57%

COPD - still breathless despite using SABA/SAMA and **no** asthma/steroid responsive features → add a LABA + LAMA

Important for me Less important

A 67-year-old man presents with progressive exertional dyspnoea. These symptoms have been getting progressively worse over the past nine months and are associated with a dry cough. He gave up smoking 20 cigarettes/day around 30 years ago. On examination his oxygen saturations are 97% on room air, respiratory rate is 14/min and there are some fine bibasal crackles. Finger clubbing is noted. Investigations show the following:

B-type natriuretic peptide	88 pg/ml (< 100pg/ml)
----------------------------	-----------------------

ECG: sinus rhythm, 72/min

Spirometry

FEV1	1.57 L (50% of predicted)
FVC	1.63 L (39% of predicted)
FEV1/FVC	96%

Which investigation is most likely to confirm the diagnosis?

☐ Acute vasodilator testing

☐ Echocardiogram

☐ Flow-volume loop

☐ High-resolution CT scan

☐ Ventilation/perfusion scan



This is a typical history of idiopathic pulmonary fibrosis: a male patient aged 50-70 years presenting with progressive exertional dyspnoea associated with clubbing and a restrictive picture on spirometry. The investigation of choice is high resolution CT scanning.

The normal B-type natriuretic peptide makes heart failure extremely unlikely.

A 62-year-old female is admitted with a suspected infective exacerbation of COPD. A chest x-ray shows no evidence of consolidation. What is the most likely causative organism?

- ☐ Pseudomonas aeruginosa
- ☐ Haemophilus influenzae
- ☐ *Staphylococcus aureus*
- ☐ Streptococcus pneumoniae
- ☐ Moraxella catarrhalis

Pseudomonas aeruginosa

7%

Haemophilus influenzae

63%

Staphylococcus aureus

5%

Streptococcus pneumoniae

11%

Moraxella catarrhalis

13%

If the patient had pneumonia then *Streptococcus pneumoniae* would be the most likely causative organism. However, the chest x-ray shows no evidence of consolidation making a diagnosis of pneumonia unlikely.

Haemophilus influenzae is the most common cause of infective exacerbations of COPD. The patient should be treated with a course of amoxicillin or a tetracycline together with prednisolone.

A 25-year-old female who is known to have asthma presents with acute shortness of breath and wheeze. Which of the following is an indicator that the attack may be classified as life threatening?

- ☐ Inability to complete sentences in a single breath
- ☐ pCO₂ of 5.0 kPa on arterial blood gas
- ☐ Chest pain
- ☐ Oxygen saturations of 94% on pulse oximetry
- ☐ Peak expiratory flow rate of 50%

Inability to complete sentences in a single breath

29%

pCO₂ of 5.0 kPa on arterial blood gas

49%

Chest pain

11%

Oxygen saturations of 94% on pulse oximetry

5%

Peak expiratory flow rate of 50%

7%

A normal pCO₂ in a patient with acute severe asthma is an indicator that the attack may be classified as life-threatening

Important for me Less important

Acute asthma is divided into four categories - moderate, severe, life-threatening and near fatal. The characteristics of life-threatening acute asthma can be found in the attached notes. Only the patient with the normal pCO₂ meets the criteria for life-threatening asthma.

A patient with less severe asthma would be expected to have a lower than normal pCO₂. They have no impairment to their alveolar function but they have an increased minute volume due to elevated respiratory rate and tidal volume. This, therefore, means that more gas exchange can take place and more CO₂ is exchanged with the environment. A normal pCO₂ is concerning because it means that there is sufficient airflow obstruction that even though the alveoli are functioning normally, insufficient gas exchange is taking place.

Any of the above indicators of life-threatening asthma should prompt an immediate phone call to ICU (as well as initiation of treatment.)

British Thoracic Society: British Guideline on the Management of Asthma

<https://www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-quick-reference-guide-2014/>

Dr Assem

A 69-year-old man with chronic obstructive pulmonary disease (COPD) presents to the Emergency Department with dyspnoea. Three days ago he was started on amoxicillin and prednisolone by his GP. Since arriving in the department he has been given back-to-back nebulised salbutamol and ipratropium bromide. The oxygen concentration has been titrated to 28% to achieve a saturation of 88-92%. Due to his poor response to treatment an aminophylline infusion is started. Thirty minutes later, his arterial blood gases show the following (taken on 28% oxygen):

pH	7.30
pCO ₂	7.6 kPa
pO ₂	8.1 kPa

What is the most appropriate next step in management?

- ☐ Intravenous magnesium sulphate
- ☐ Intravenous hydrocortisone
- ☐ Decrease his oxygen to 24%
- ☐ Non-invasive ventilation
- ☐ Increase his oxygen to 35%

Intravenous magnesium sulphate

9%

Intravenous hydrocortisone

6%

Decrease his oxygen to 24%

7%

Non-invasive ventilation

73%

Increase his oxygen to 35%

5%

Intravenous magnesium sulphate is useful in acute asthma, rather than COPD. Giving intravenous hydrocortisone is unlikely to make any difference given that he has had three days worth of prednisolone already.

Dr. Assem

Which one of the following would cause a rise in the carbon monoxide transfer factor (TLCO)?

- ☐ Emphysema
- ☐ Pulmonary embolism
- ☐ Pulmonary haemorrhage
- ☐ Pneumonia
- ☐ Pulmonary fibrosis

Emphysema

16%

Pulmonary embolism

12%

Pulmonary haemorrhage

65%

Pneumonia

3%

Pulmonary fibrosis

5%

Transfer factor

- raised: asthma, haemorrhage, left-to-right shunts, polycythaemia
- low: everything else

Important for me Less important

Where alveolar haemorrhage occurs the TLCO tends to increase due to the enhanced uptake of carbon monoxide by intra-alveolar haemoglobin

Dr Assem

A 74-year-old man presents with confusion and is found to have evidence of right lower lobe pneumonia on chest x-ray. On examination the respiratory rate is 36 breaths per minute, pulse rate is 90 per minute and the blood pressure is 106/48 mmHg. Initial bloods show a urea of 12 mmol/l.

His CURB 65 score is:

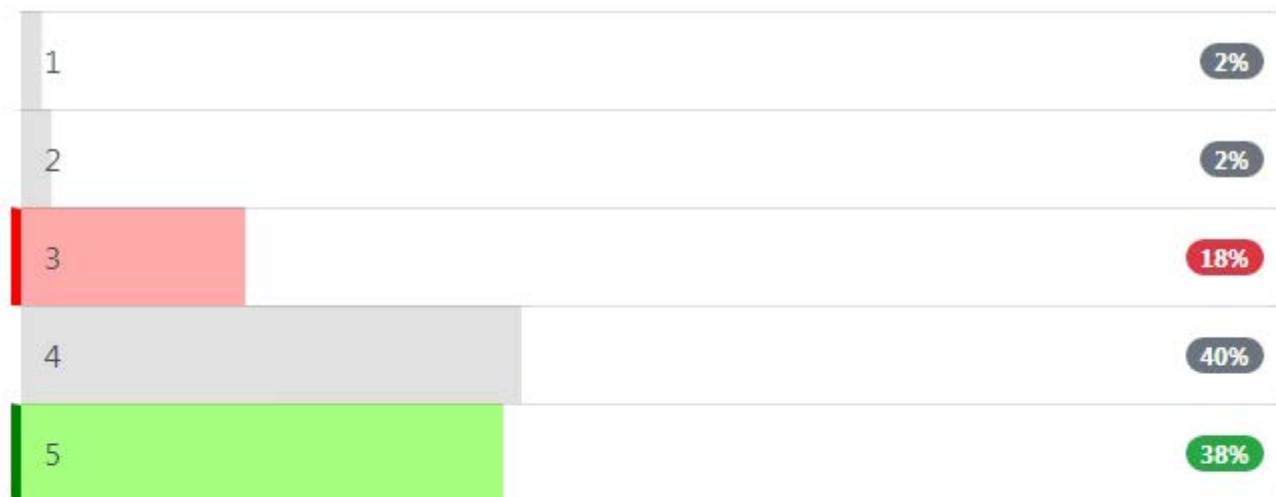
☐ 1

☐ 2

☐ 3

☐ 4

☐ 5



CURB 65 is an evidence based tool used to risk stratify patients presenting with pneumonia. This question assesses your ability to calculate a score quickly.

This patient scores 5: (Confusion = 1, Urea > 7 mmol/L = 1, Respiratory rate > 30 = 1, Diastolic BP < 60 mmHg = 1, Age > 65 = 1).

A score of 5 necessitates admission to hospital for treatment with IV antibiotics and depending on clinical assessment either intermediate or intensive care admission may be warranted.

A 68-year-old male patient presents with a 6-month history of shortness of breath. He mentions that it is worse on exertion and his exercise tolerance is reduced compared to previously. He describes no associated wheeze, or haemoptysis but does have a dry cough. He has a background of hypertension and takes amlodipine 5mg once a day. He has never smoked or worked with asbestos in the past.

On examination, he is comfortable at rest with oxygen saturations 95% on air. There is no evidence of lymphadenopathy, clubbing or cyanosis. He has fine crackles at both lung bases that do not alter on coughing.

You suspect the patient may have idiopathic pulmonary fibrosis and organise some investigations.

Which of the following investigation findings would support a diagnosis of idiopathic pulmonary fibrosis?

- ☐ Reticular changes on CT imaging that is worse at the bases
- ☐ Obstructive picture on spirometry
- ☐ Extensive ground glass opacities on CT imaging
- ☐ Increased transfer factor on spirometry
- ☐ A lymphocytosis on bronchoalveolar lavage

Reticular changes on CT imaging that is worse at the bases	52%
Obstructive picture on spirometry	3%
Extensive ground glass opacities on CT imaging	37%
Increased transfer factor on spirometry	4%
A lymphocytosis on bronchoalveolar lavage	4%

The history is suggestive of pulmonary fibrosis.

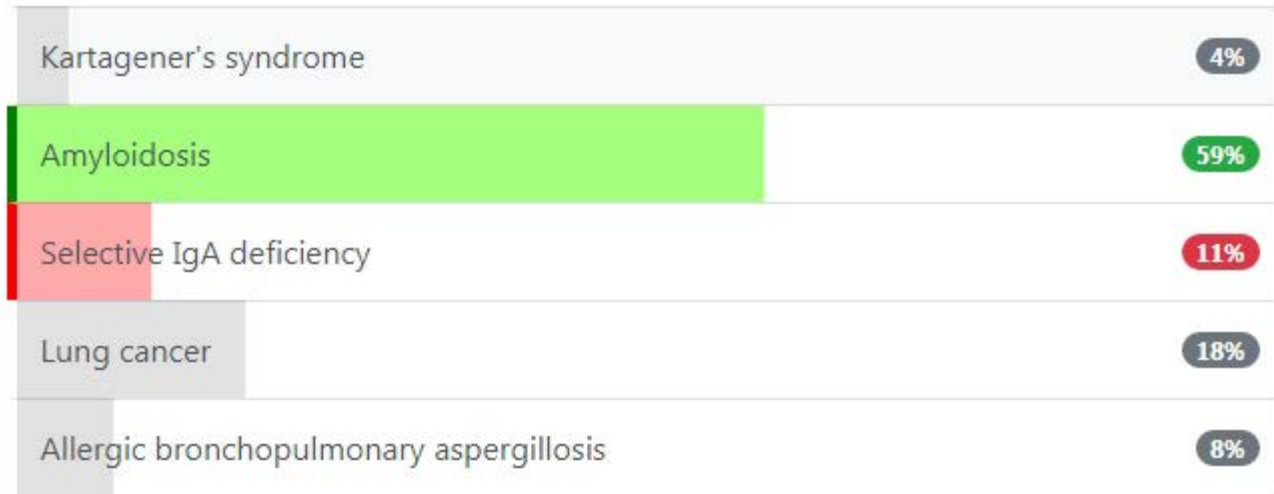
On CT imaging the changes are often seen are honeycombing, reticular opacities, traction bronchiectasis, and architectural distortion. Ground-glass opacities are less of a feature of idiopathic pulmonary fibrosis. The changes are usually more pronounced at the bases.

Spirometry typically shows a restrictive defect and a reduced transfer factor.

Bronchoalveolar lavage is not usually done in the work up of pulmonary fibrosis as it is usually non-specific. A lymphocytosis suggests an alternative diagnosis.

Each one of the following may result in bronchiectasis, except:

- ☐ Kartagener's syndrome
- ☐ Amyloidosis
- ☐ Selective IgA deficiency
- ☐ Lung cancer
- ☐ Allergic bronchopulmonary aspergillosis



Amyloidosis does not cause bronchiectasis per se, but may be seen in bronchiectasis as a consequence of chronic inflammation and infection

A 29-year-old man is admitted with sudden onset dyspnoea and pleuritic chest pain. He is a smoker but has no history of respiratory disease. He considers himself healthy and regularly plays rugby. On admission he has a chest x-ray that shows a pneumothorax with a 3cm rim of air. Aspiration is successful and he is discharged. A follow-up chest x-ray two weeks later shows a complete resolution. What is the single most important piece of advice to reduce his risk of further pneumothoraces?

- ☐ Avoid flying for 12 months
- ☐ Avoid contact sports for 12 months
- ☐ Stop smoking
- ☐ Arrange a course of respiratory physiotherapy
- ☐ Seek prompt medical advice for potential respiratory infections

Avoid flying for 12 months	8%
Avoid contact sports for 12 months	8%
Stop smoking	76%
Arrange a course of respiratory physiotherapy	4%
Seek prompt medical advice for potential respiratory infections	4%

All patients should be advised to avoid smoking to reduce the risk of further episodes - the lifetime risk of developing a pneumothorax in healthy smoking men is around 10% compared with around 0.1% in non-smoking men.

With respect to 'Fitness to fly' rules the CAA suggest patients may travel 2 weeks after successful drainage if there is no residual air. The British Thoracic Society used to recommend not travelling by air for a period of 6 weeks but this has now been changed to 1 week post check x-ray

A 60-year-old patient with known allergic bronchopulmonary aspergillosis presents to the Emergency Department with an exacerbation. Which of these therapies represents the most appropriate management?

- ☐ Nebulised ipratropium bromide
- ☐ Nebulised salbutamol
- ☐ Intravenous voriconazole
- ☐ Oral glucocorticoids
- ☐ Oral itraconazole



The mainstay of the treatment of allergic bronchopulmonary aspergillosis (ABPA) is a systemic glucocorticoid such as prednisolone, which is slowly tapered over the course of 3 to 12 months depending on regimen.

Oral antifungals are often used as an adjunct, and may help reduce long-term glucocorticoid use. Both itraconazole and voriconazole may be hepatotoxic and patients should be monitored for evidence of hepatotoxicity.

ABPA and asthma may co-exist, and in this instance patients may benefit from nebulised therapy, however this does not form part of the routine treatment of ABPA.

A 45-year-old gentleman with a background of long-standing asthma is admitted to the emergency department with shortness of breath and wheeze. Two days prior to this he had been given co-trimoxazole by his General Practitioner for a suspected bronchopneumonia. His observations reveal a respiratory rate of 26/min, oxygen saturations 94% on room air, heart rate 86bpm, temperature 37.7 degrees celsius.

His blood shows the following:

Hb	121 g/l
Platelets	$221 \times 10^9/l$
WBC	$12.2 \times 10^9/l$
Lymphocytes	$5.1 \times 10^9/l$
Neutrophils	$6.2 \times 10^9/l$
Eosinophils	$2.2 \times 10^9/l$

He goes on to have a chest x-ray which reveals proximal bronchiectasis but no focal consolidation.

What is the most likely underlying diagnosis?

- ☐ Exacerbation of asthma
- ☐ Loeffler syndrome
- ☐ Allergic bronchopulmonary aspergillosis
- ☐ Churg-Strauss syndrome
- ☐ DRESS syndrome

Exacerbation of asthma	11%
Loeffler syndrome	16%
Allergic bronchopulmonary aspergillosis	47%
Churg-Strauss syndrome	17%
DRESS syndrome	9%

The answer is allergic bronchopulmonary aspergillosis.

Major criteria for the diagnosis are:

- Clinical features of asthma
- Proximal bronchiectasis
- Blood eosinophilia
- Immediate skin reactivity to *Aspergillus* antigen
- Increased serum IgE (>1000 IU/ml)

Minor criteria:

- Fungal elements in sputum
- Brown flecks in sputum
- Delayed skin reactivity to fungal antigens

(Reference: Rosenberg M, Patterson R, Mintzer R et-al. Clinical and immunologic criteria for the diagnosis of allergic bronchopulmonary aspergillosis. *Ann. Intern. Med.* 1977;86 (4): 405-14).

Loeffler syndrome is associated with evidence of tropical infections and there is no history of foreign travel here. True asthma is not directly associated with bronchiectasis and Churg-Strauss is associated with p-ANCA antibodies. DRESS syndrome is associated with eosinophilia but tends to cause a rash and systemic upset such as a fever.

A 56-year-old gentleman is admitted with worsening shortness of breath on exertion, fever, and cough. He has a 15 pack-year smoking history and is a foundry worker. His respiratory rate is 28/min, heart rate 80bpm, and temperature 37.6°C. On auscultation of his chest, there were crepitations throughout both lung fields.

Chest X-ray reveals calcified hilar nodules. A subsequent HRCT shows an eggshell calcification pattern.

What is the most likely diagnosis?

- ☐ Berylliosis
- ☐ Silicosis
- ☐ Tuberculosis
- ☐ Sarcoidosis
- ☐ Histoplasmosis

Berylliosis	9%
Silicosis	75%
Tuberculosis	3%
Sarcoidosis	9%
Histoplasmosis	4%

The key here is this gentleman's occupational history and the radiological findings which point towards the diagnosis of chronic silicosis. The typical chest X-ray findings in chronic silicosis are multiple and small well-rounded nodules, particularly in the upper zone. As the disease progresses the hilar retracts upwards and cavitation can occur leading to the potential for a secondary tuberculosis infection. Classically, eggshell calcification is seen on imaging.

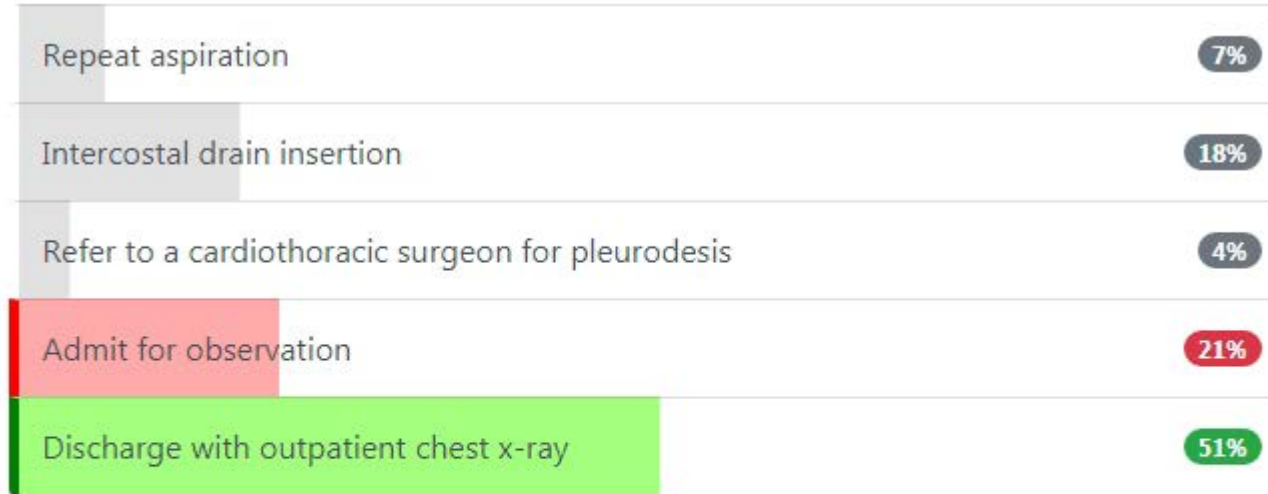
Berylliosis typically affects exposed individuals within the aeronautical, metal, and electronics industry. Berylliosis and sarcoidosis have similar clinical features such as bilateral hilar lymphadenopathy, shortness of breath, and dry cough.

Histoplasmosis is an uncommon mycosis, that is usually asymptomatic with radiographic features of mediastinal involvement. Tuberculosis does not tend to form eggshell calcification.

A 27-year-old man with no significant past medical history of note presents to the Emergency Department with a one day history of dyspnoea and right-sided pleuritic chest pain. A chest x-ray is taken which shows a right pneumothorax with a 2.5cm rim of air and no mediastinal shift. Aspiration is performed by the admitting doctor.

He is reviewed four hours later. His dyspnoea has resolved but the chest x-ray shows that whilst the pneumothorax has improved there is still a 1.5cm rim of air. What is the most appropriate management?

- ☐ Repeat aspiration
- ☐ Intercostal drain insertion
- ☐ Refer to a cardiothoracic surgeon for pleurodesis
- ☐ Admit for observation
- ☐ Discharge with outpatient chest x-ray



The British Thoracic Society algorithm for spontaneous pneumothorax suggests that if following aspiration the rim of air is $< 2\text{cm}$ and the breathing has improved then discharge should be considered with outpatient review.

A 35-year-old woman presents with a chronic history of a productive cough. On examination, she has finger clubbing and late inspiratory crackles. She is suspected of having bronchiectasis. Which gene is associated with bronchiectasis?

☐ HLA-DR1

☐ HLA-DR2

☐ HLA-DR3

☐ HLA-DR4

☐ HLA-B27

HLA-DR1	29%
HLA-DR2	23%
HLA-DR3	20%
HLA-DR4	16%
HLA-B27	11%

The correct answer is HLA-DR1.

HLA associations:

HLA-DR1: bronchiectasis

HLA-DR2: systemic lupus erythematosus (SLE)

HLA-DR3: autoimmune hepatitis, primary Sjogren syndrome, type 1 diabetes Mellitus, SLE

HLA-DR4: rheumatoid arthritis, type 1 diabetes Mellitus

HLA-B27: ankylosing spondylitis, postgonococcal arthritis, acute anterior uveitis

Source:

Boyton RJ, Smith J, Jones M, et al. Human leucocyte antigen class II association in idiopathic bronchiectasis, a disease of chronic lung infection, implicates a role for adaptive immunity. Clinical and Experimental Immunology. 2008;152(1):95-101. doi:10.1111/j.1365-2249.2008.03596.x.+

You are the SHO on the respiratory team. A 70-year-old man presents to the emergency department (ED) after a fall at home. He had been taking a course of oral antibiotics prescribed by his GP for a urinary tract infection (UTI). He describes pain over the right chest wall with pleuritic features and complains of shortness of breath. Initial observations reveal a heart rate (HR) of 85 bpm, RR 19 and he is saturating at 95% on 4L/min oxygen via facemask. The ED doctor notes reduced breath sounds over the right hemithorax and dull percussion. A chest x-ray (CXR) demonstrates a right-sided pneumothorax (no tension) with a 3cm rim of air associated with a fracture of the 5th rib. A chest drain was inserted under ultrasound guidance in the emergency department, 360ml of serosanguinous fluid was rapidly drained and 15cmH₂O suction was applied. The patient is admitted under the care of the respiratory team. A repeat chest x-ray at 1-hour showed complete resolution of the pneumothorax and the gentleman is now saturating at 96% on 2L/min and he is transferred to the wards. 2 hours later, however, you are called to review the patient as he has become severely short of breath and his saturations have fallen to 75%. There are no obvious issues with the drain. A portable CXR shows isolated alveolar shadowing on the right side.

What is the cause of this man's deterioration?

- ☐ Recurrent pneumothorax
- ☐ Underlying community-acquired pneumonia
- ☐ Haemothorax
- ☐ Re-expansion pulmonary oedema
- ☐ Pulmonary embolism

Recurrent pneumothorax	8%
Underlying community-acquired pneumonia	4%
Haemothorax	14%
Re-expansion pulmonary oedema	64%
Pulmonary embolism	10%

Over rapid aspiration/drainage of pneumothorax can result in re-expansion pulmonary oedema

Important for me [Less important](#)

The correct answer is re-expansion pulmonary oedema (RPE)

This is a complication that can develop due to over-rapid re-expansion of the lung after large volume thoracocentesis for pneumothorax or effusion.

It is relatively uncommon and usually occurs within 1-2 hours of thoracocentesis but may develop up to 24 hours after. RPE may progress over 1-2 days and usually resolves several days later.

Risk factors for RPE include:

- 1. Longer duration of lung collapse
- 2. Larger volume of lung collapse
- 3. Rapid drainage of pleural fluid/air
- 4. Application of negative pleural pressure (suction)
- 5. Younger age of patient

A 61-year-old smoker presents with a three week history of worsening breathlessness. A chest X-ray shows a large left-sided pleural effusion.

He has a small amount of the effusion aspirated and sent off for examination. Which of the following laboratory results would point to this effusion being an exudate rather than a transudate?

(LDH = lactate dehydrogenase)

- ☐ Pleural fluid LDH / Serum LDH <0.6
- ☐ Effusion LDH level greater than 2/3rds the upper limit of serum LDH
- ☐ Pleural fluid protein / Serum protein <0.5
- ☐ Pleural fluid glucose/ Serum glucose >0.4
- ☐ Effusion LDH level greater than 1/3rd the upper limit of serum LDH

Pleural fluid LDH / Serum LDH <0.6

8%

Effusion LDH level greater than 2/3rds the upper limit of serum LDH

64%

Pleural fluid protein / Serum protein <0.5

11%

Pleural fluid glucose/ Serum glucose >0.4

7%

Effusion LDH level greater than 1/3rd the upper limit of serum LDH

10%

Light's criteria: Effusion LDH level greater than 2/3rds the upper limit of serum LDH points to exudate

Important for me Less important

Light's Criteria for exudative effusion requires one of more of the following:

- Pleural fluid protein / Serum protein >0.5
- Pleural fluid LDH / Serum LDH >0.6
- Pleural fluid LDH $> 2/3 \times$ Serum LDH upper limit of normal
- Glucose is not used in Light's Criteria.

Which one of the following is not part of the diagnostic criteria of acute respiratory distress syndrome (ARDS)?

☐ Bilateral infiltrates on CXR

☐ Non-cardiogenic

☐ $pO_2/FiO_2 < 200$ mmHg

☐ Respiratory rate > 24 /min

☐ Acute onset

Bilateral infiltrates on CXR

7%

Non-cardiogenic

10%

pO₂/FiO₂ < 200 mmHg

24%

Respiratory rate > 24/min

54%

Acute onset

6%

You are reviewing the management of a number of patients with chronic obstructive pulmonary disease (COPD). Which one of the following factors should prompt an assessment for long-term oxygen therapy?

- ☐ FEV1 54% of predicted
- ☐ Haemoglobin of 18.4 g/dl
- ☐ Body mass index 18.8 kg / m²
- ☐ Oxygen saturations of 93% on room air
- ☐ FEV1/FVC of 0.47

FEV1 54% of predicted

9%

Haemoglobin of 18.4 g/dl

63%

Body mass index 18.8 kg / m²

3%

Oxygen saturations of 93% on room air

5%

FEV1/FVC of 0.47

20%

A 24-year-old female with a history of anxiety is taken to the Emergency Department following an acute onset of shortness of breath. On examination the chest is clear to auscultation but the respiratory rate is raised at 40 breaths per minute. A diagnosis of hyperventilation secondary to anxiety is suspected. Which of the following arterial blood gas results (taken on room air) are consistent with this?

- ☐ pH = 7.56; pCO₂ = 2.9 kPa; pO₂ = 10.1 kPa
- ☐ pH = 7.24; pCO₂ = 8.4 kPa; pO₂ = 12.7 kPa
- ☐ pH = 7.34; pCO₂ = 2.7 kPa; pO₂ = 15.4 kPa
- ☐ pH = 7.54; pCO₂ = 2.4 kPa; pO₂ = 14.1 kPa
- ☐ pH = 7.54; pCO₂ = 4.9 kPa; pO₂ = 13.3 kPa

pH = 7.56; pCO₂ = 2.9 kPa; pO₂ = 10.1 kPa

18%

pH = 7.24; pCO₂ = 8.4 kPa; pO₂ = 12.7 kPa

7%

pH = 7.34; pCO₂ = 2.7 kPa; pO₂ = 15.4 kPa

9%

pH = 7.54; pCO₂ = 2.4 kPa; pO₂ = 14.1 kPa

59%

pH = 7.54; pCO₂ = 4.9 kPa; pO₂ = 13.3 kPa

7%

Hyperventilation will result in carbon dioxide being 'blown off', causing an alkalosis.

Whilst the gases in answer A show a respiratory alkalosis the hypoxia could not be explained by hyperventilation

Dr Assem

Which one the following statements regarding asbestos is not correct?

- ☐ Pleural plaques are premalignant
- ☐ Asbestosis typically affects the lower zones
- ☐ Crocidolite (blue) asbestos is the most dangerous form
- ☐ Severity of asbestosis is related to the length of exposure
- ☐ Mesothelioma may develop following minimal exposure

Pleural plaques are premalignant

41%

Asbestosis typically affects the lower zones

16%

Crocidolite (blue) asbestos is the most dangerous form

11%

Severity of asbestosis is related to the length of exposure

13%

Mesothelioma may develop following minimal exposure

19%

What is the mode of inheritance of alpha-1 antitrypsin deficiency?

- ☐ Mitochondrial
- ☐ X-linked recessive
- ☐ Polygenic
- ☐ Autosomal recessive
- ☐ Autosomal dominant



Alpha-1 antitrypsin deficiency - autosomal recessive / co-dominant

Important for me Less important

Alpha-1 antitrypsin deficiency is also sometimes listed as being an autosomal co-dominant condition. Unfortunately trusted sources vary - how would you classify A1AT?

Which one of the following would shift the oxygen dissociation curve to the left?

☐ Carboxyhaemoglobin

☐ Acidosis

☐ Raised $p\text{CO}_2$

☐ Pyrexia

☐ Raised 2,3-DPG levels

Carboxyhaemoglobin

57%

Acidosis

17%

Raised pCO₂

9%

Pyrexia

6%

Raised 2,3-DPG levels

11%

Oxygen dissociation curve

- shifts **Left** - **Lower** oxygen delivery - **Lower** acidity, temp, 2-3 DPG - also HbF, carboxy/methaemoglobin
- shifts **Right** - **Raised** oxygen delivery - **Raised** acidity, temp, 2-3 DPG

Important for me Less Important

Pulmonary arterial hypertension may be seen in each one of the following conditions, except:

- ☐ Hepatitis B
- ☐ Eisenmenger's syndrome
- ☐ Sickle cell anaemia
- ☐ HIV
- ☐ Sarcoidosis

Hepatitis B

56%

Eisenmenger's syndrome

8%

Sickle cell anaemia

9%

HIV

11%

Sarcoidosis

16%

Hepatitis B is not a recognised cause of pulmonary arterial hypertension

Each one of the following is a risk factor for lung cancer, except:

- ☐ Radon
- ☐ Cryptogenic fibrosing alveolitis
- ☐ Coal dust
- ☐ Asbestos
- ☐ Arsenic

Radon

13%

Cryptogenic fibrosing alveolitis

20%

Coal dust

46%

Asbestos

6%

Arsenic

15%

Which one of the following is least associated with Kartagener's syndrome?

☐ Male subfertility

☐ Recurrent sinusitis

☐ Malabsorption

☐ Dextrocardia

☐ Bronchiectasis

Male subfertility

11%

Recurrent sinusitis

8%

Malabsorption

63%

Dextrocardia

11%

Bronchiectasis

7%

Which one of the following causes of lung fibrosis predominately affect the upper zones?

- ☐ Bleomycin
- ☐ Rheumatoid arthritis
- ☐ Idiopathic pulmonary fibrosis
- ☐ Methotrexate
- ☐ Extrinsic allergic alveolitis

Bleomycin

7%

Rheumatoid arthritis

10%

Idiopathic pulmonary fibrosis

9%

Methotrexate

8%

Extrinsic allergic alveolitis

65%

Upper zones lung fibrosis: hypersensitivity pneumonitis

Important for me Less important

A 61-year-old female is reviewed in the rheumatology clinic with increasing shortness of breath. She has been on long-term drug therapy to control her rheumatoid arthritis and has a 40 pack-year history of smoking . Her oxygen saturations on room air are on 89%. Investigations reveal the following:

FEV1%	80%
Transfer factor coefficient (TLCO)	41%

What is the most likely cause for her symptoms?

- ☐ Pulmonary nodules
- ☐ Methotrexate pneumonitis
- ☐ Pulmonary haemorrhage
- ☐ Bronchiolitis obliterans
- ☐ Chronic obstructive pulmonary disease

Pulmonary nodules	5%
Methotrexate pneumonitis	60%
Pulmonary haemorrhage	8%
Bronchiolitis obliterans	20%
Chronic obstructive pulmonary disease	8%

A FEV1% of 80% would not support a diagnosis of COPD or bronchiolitis obliterans. Methotrexate pneumonitis is potentially life-threatening and occurs in 1-5% of patients who are treated with methotrexate. Pulmonary fibrosis should be part of the differential diagnosis

A 77-year-old man with a history of type 2 diabetes mellitus is admitted to hospital with worsening shortness-of-breath. He started a course of amoxicillin given by his GP 5 days ago. On examination blood pressure is 88/60 mmHg with a respiratory rate of 36 / min. A chest x-ray reveals left lower lobe consolidation. Arterial blood gases on air are as follows:

pH	7.37
pCO ₂	5.5 kPa
pO ₂	9.1 kPa

What is the most suitable antibiotic therapy?

- ☐ Oral amoxicillin + erythromycin
- ☐ Intravenous ceftriaxone
- ☐ Intravenous co-amoxiclav + clarithromycin
- ☐ Intravenous vancomycin + clarithromycin
- ☐ Oral co-amoxiclav + erythromycin

Oral amoxicillin + erythromycin

5%

Intravenous ceftriaxone

12%

Intravenous co-amoxiclav + clarithromycin

67%

Intravenous vancomycin + clarithromycin

12%

Oral co-amoxiclav + erythromycin

4%

This patient has a severe pneumonia as the CURB score is 3. He should therefore be treated with a combination of intravenous antibiotics as recommended by the British Thoracic Society guidelines.

Each one of the following is a known cause of occupational asthma, except:

- ☐ Isocyanates
- ☐ Cadmium
- ☐ Soldering flux resin
- ☐ Flour
- ☐ Platinum salts

Isocyanates

15%

Cadmium

42%

Soldering flux resin

10%

Flour

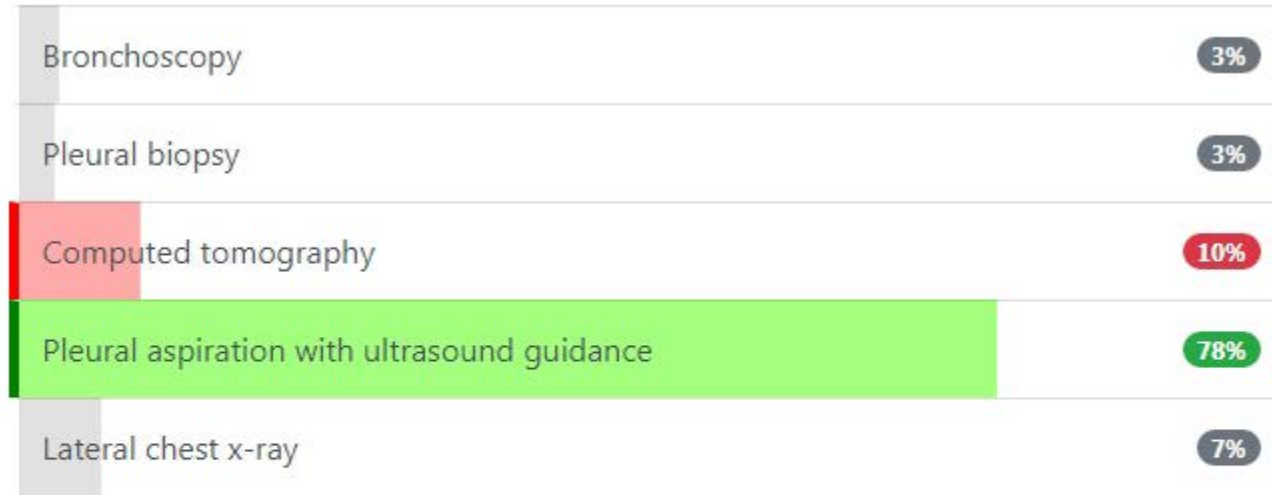
18%

Platinum salts

16%

An elderly patient with a history of chronic obstructive pulmonary disease is admitted following an infective exacerbation. The posterioranterior (PA) chest x-ray on admission shows a unilateral pleural effusion. Which one of the following is the most useful next line investigation?

- ☐ Bronchoscopy
- ☐ Pleural biopsy
- ☐ Computed tomography
- ☐ Pleural aspiration with ultrasound guidance
- ☐ Lateral chest x-ray



Ultrasound is recommended by the British Thoracic Society as it increases the likelihood of successful pleural aspiration and is sensitive for detecting pleural fluid septations.

A 35-year-old man is seen due to an extensive petechial rash on his lower legs for the last 2 weeks. He has minimal past medical history other than asthma and surgical removal of nasal polyps aged 23 and 29 years. Blood tests show

Hb	131 g/L
WBC	18.9 $10^9/L$
Platelets	230 $10^9/L$
Eosinophils	5.19 $10^9/L$

Na +	139mmol/L
K +	4.9mmol/L
Urea	12.6mmol/L
Creatinine	250umol/L
CRP	90mg/L

Which antibody is associated with the likely diagnosis?

- ☐ pANCA
- ☐ cANCA
- ☐ Anti-centromere antibodies
- ☐ Anti-cardiolipin antibodies
- ☐ Anti-GBM antibodies

pANCA

63%

cANCA

27%

Anti-centromere antibodies

3%

Anti-cardiolipin antibodies

2%

Anti-GBM antibodies

6%

Churg-Strauss syndrome - positive pANCA serology

Important for me Less important

Churg-Strauss disease is associated with pANCA.

There are three stages to the presentation of Churg-Strauss disease.

The initial phase is characterised by allergy with many patients having a history of asthma or allergic rhinitis. This inflammation of the nasal passages can lead to the development of nasal polyps.

The second phase is eosinophilia

The third stage is the vasculitis itself which affects small and medium-sized blood vessels and therefore resulting in damage to many organs. Given this patient's kidney failure, it appears to be affecting his renal blood supply.

Other common affected organs are the lungs, the digestive tract and most dangerously, the heart.

The features in the history that tell us it is Churg-Strauss syndrome are the history of asthma and recurrent nasal polyps (the first stage), eosinophilia (the second stage) and impaired kidney function and petechial rash (the third stage).

Dr Assem

A 41-year-old man with a past history of asthma presents with pain and weakness in his left hand. Examination findings are consistent with a left ulnar nerve palsy. Blood tests reveal an eosinophilia. Which one of the following antibodies is most likely to be present?

☐ ANA

☐ Anti-Scl70

☐ pANCA

☐ Antiphospholipid antibodies

☐ cANCA

ANA	6%
Anti-Scl70	6%
pANCA	75%
Antiphospholipid antibodies	3%
cANCA	11%

Churg-Strauss syndrome - positive pANCA serology

Important for me Less important

This patient has Churg-Strauss syndrome as evidenced by the asthma, mononeuritis and eosinophilia

A middle aged woman presents with progressive shortness of breath. Chest X ray shows bilateral hilar lymphadenopathy.

Calcium	2.7mmol/l
Angiotensin converting enzyme	200µg/l (<40µg/l)

Given the likely diagnosis, which of the following features would be associated with a good prognosis?

- ☐ Lupus pernio
- ☐ Hypercalcaemia
- ☐ Age > 40
- ☐ Erythema nodosum
- ☐ HLA B13 subtype

Lupus pernio	6%
Hypercalcaemia	5%
Age > 40	6%
Erythema nodosum	72%
HLA B13 subtype	10%

This woman has sarcoidosis. Factors associated with a good prognosis include HLA B8 and Lofgren's syndrome (bilateral hilar lymphadenopathy, erythema nodosum, polyarthritis and fever). All the other factors listed above are associated with a poor prognosis.

A 66-year-old man presents to the respiratory clinic with worsening shortness of breath. He is otherwise well and is a retired dockyard worker. He is a lifelong non-smoker.

On examination he has fine crackles at both lung bases.

A chest X-ray shows fine reticulonodular shadowing at both lung bases and several pleural plaques.

He undergoes pulmonary function testing.

Which of these pulmonary function tests fits with the likely diagnosis?

☐ Transfer factor for CO (TLCO) 45% of predicted value

☐ Forced expiratory volume in one second (FEV1) 60%

☐ A concave flow/volume loop

☐ FEV1/Forced Vital Capacity (FVC) 70%

☐ Transfer coefficient (KCO) of 110%

Transfer factor for CO (TLCO) 45% of predicted value	52%
Forced expiratory volume in one second (FEV1) 60%	13%
A concave flow/volume loop	10%
FEV1/Forced Vital Capacity (FVC) 70%	16%
Transfer coefficient (KCO) of 110%	10%

The history given above is highly suggestive of asbestosis - given this gentleman's previous occupation, pleural plaques and basal crackles.

In asbestosis the transfer factor for carbon monoxide (TLCO) is reduced, so this is the correct answer.

It is useful to understand the relationship between TLCO and transfer co-efficient of carbon monoxide (KCO), to know why they are affected differently in different diseases. KCO is a measure of the efficiency of gas exchange into the blood stream. It is reduced if the lungs are damaged and increased if there is additional blood in the lungs to remove carbon monoxide.

$$TLCO = KCO \times \text{Alveolar volume (VA)}$$

Asbestosis is a restrictive lung disease that reduces lung volume (VA), but the fibrosis of alveoli also impairs gas exchange in the alveoli (KCO), so TLCO will also be reduced.

In restrictive lung disease e.g. secondary to muscle weakness, you can see the the alveolar volume will be reduced giving a low TLCO, but gas exchange is unaffected so KCO will be normal or possibly high (as capillary blood flow is shunted to the areas of lung that are adequately perfused).

Asbestosis also gives a restrictive pattern on pulmonary function tests so, a reduced FEV1 of 60%, a reduced FEV1/FVC ratio of 70% and a concave flow/volume loop are all incorrect as they are suggestive of an obstructive pathology e.g. chronic obstructive pulmonary disease.

A 55-year-old man is diagnosed with non-small cell lung cancer. Which one of the following is a contraindication to surgery?

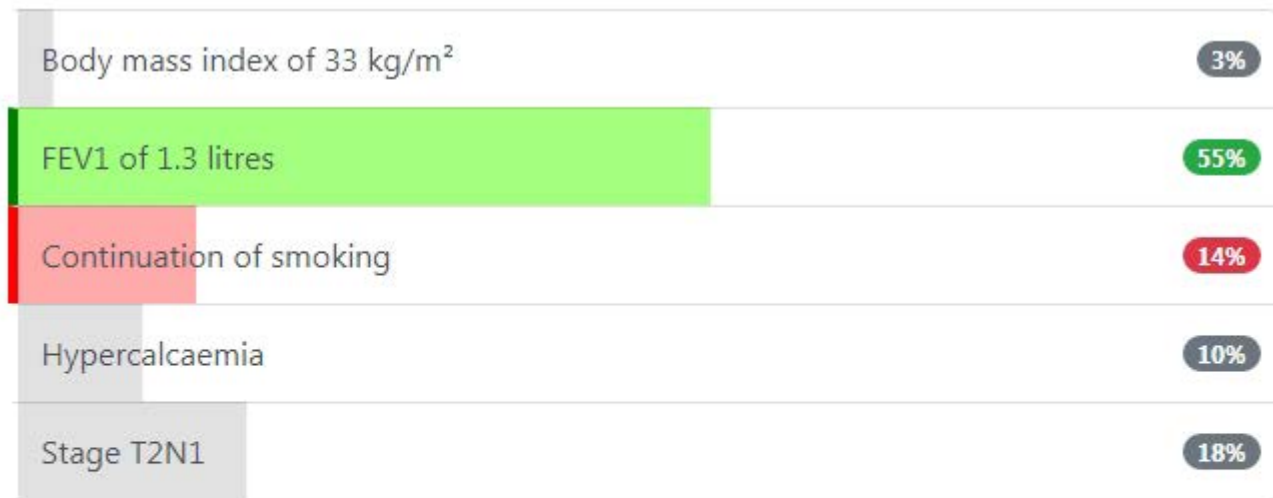
☐ Body mass index of 33 kg/m²

☐ FEV1 of 1.3 litres

☐ Continuation of smoking

☐ Hypercalcaemia

☐ Stage T2N1



Contraindications to lung cancer surgery include SVC obstruction, FEV < 1.5, MALIGNANT pleural effusion, and vocal cord paralysis

Important for me Less important

A 58-year-old man with chronic obstructive pulmonary disease (COPD) presents with a 1-week history of increased breathlessness and reduced exercise tolerance. His COPD is usually managed with a salbutamol inhaler as required and a salmeterol inhaler. He has a chronic cough productive of clear sputum but denies any recent change in this.

He appears breathless and his respiratory rate is 24 breaths per minute, but there is no use of accessory muscles at rest. All other clinical observations were normal. On auscultation of his chest you note expiratory wheeze throughout but good air entry and no other added sounds.

Other than encouraging the use of his salbutamol inhaler, what is the most appropriate management?

- ☐ Give a course of oral prednisolone for 7 days
- ☐ Give a course of oral prednisolone for 7 days and oral amoxicillin for 5 days
- ☐ Give a course of oral prednisolone for 7 days and oral clarithromycin for 5 days
- ☐ Give a course of oral prednisolone for 5 days and oral amoxicillin for 5 days
- ☐ Give a course of oral prednisolone for 7 days and oral furosemide for 7 days

Give a course of oral prednisolone for 7 days

61%

Give a course of oral prednisolone for 7 days and oral amoxicillin for 5 days

13%

Give a course of oral prednisolone for 7 days and oral clarithromycin for 5 days

10%

Give a course of oral prednisolone for 5 days and oral amoxicillin for 5 days

11%

Give a course of oral prednisolone for 7 days and oral furosemide for 7 days

5%

NICE only recommend giving oral antibiotics in an acute exacerbation of COPD in the presence of purulent sputum or clinical signs of pneumonia

Important for me Less important

This man is presenting with an acute exacerbation of his COPD. NICE recommend increasing the frequency of bronchodilator use and giving a 7-14 day course of oral prednisolone if there is significant breathlessness. NICE only recommend giving oral antibiotics to treat an acute exacerbation of COPD in the presence of purulent sputum or clinical signs of pneumonia which are absent in this case. There is nothing in the question to suggest that he is fluid overloaded and so furosemide would not be appropriate.

A 76-year-old man is admitted with a right hemiparesis. On examination his blood pressure is 120/78 mmHg, pulse 84 bpm and oxygen saturations 96% on room air. A CT scan excludes intracerebral haemorrhage and he is given aspirin 300mg. What is the most appropriate management with regards to oxygen therapy in the first 12 hours following admission?

- ☐ 35% via Venturi mask
- ☐ 24% via Venturi mask
- ☐ No oxygen therapy
- ☐ 28% via Venturi mask
- ☐ 2 litres/minute via nasal cannulae

35% via Venturi mask

2%

24% via Venturi mask

3%

No oxygen therapy

85%

28% via Venturi mask

5%

2 litres/minute via nasal cannulae

5%

Both the NICE stroke guidelines and British Thoracic Society oxygen guidelines do not support giving oxygen in this scenario.

Which one of the following paraneoplastic features is LEAST commonly seen in patients with squamous cell lung cancer?

- ☐ Lambert-Eaton syndrome
- ☐ Hyperthyroidism
- ☐ Hypertrophic pulmonary osteoarthropathy
- ☐ Hypercalcaemia
- ☐ Clubbing

Lambert-Eaton syndrome

58%

Hyperthyroidism

23%

Hypertrophic pulmonary osteoarthropathy

9%

Hypercalcaemia

6%

Clubbing

5%

Paraneoplastic features of lung cancer

- squamous cell: PTHrp, clubbing, HPOA
- small cell: ADH, ACTH, Lambert-Eaton syndrome

Important for me Less important

Lambert-Eaton syndrome occurs almost exclusively in small cell lung cancer

A 31-year-old woman is referred to the acute medical unit with a 4 day history of polyarthritis and a low-grade pyrexia. Examination reveals shin lesions which the patient states are painful. Chest x-ray shows a bulky mediastinum. What is the most likely diagnosis?

- ☐ Loffler's syndrome
- ☐ Lofgren's syndrome
- ☐ Systemic lupus erythematosus
- ☐ Gonococcal arthritis
- ☐ Reiter's syndrome

Löffler's syndrome

21%

Lofgren's syndrome

62%

Systemic lupus erythematosus

9%

Gonococcal arthritis

3%

Reiter's syndrome

4%

Löffler's syndrome is a cause of pulmonary eosinophilia thought to be caused by parasites such as *Ascaris lumbricoides*

A 55-year-old man presents to clinic with a persistent cough and occasional haemoptysis. He has a 40 pack-year history of smoking. An urgent chest x-ray is reported as being normal. In patients who are subsequently diagnosed with lung cancer, what percentage of recent chest x-rays were reported as normal?

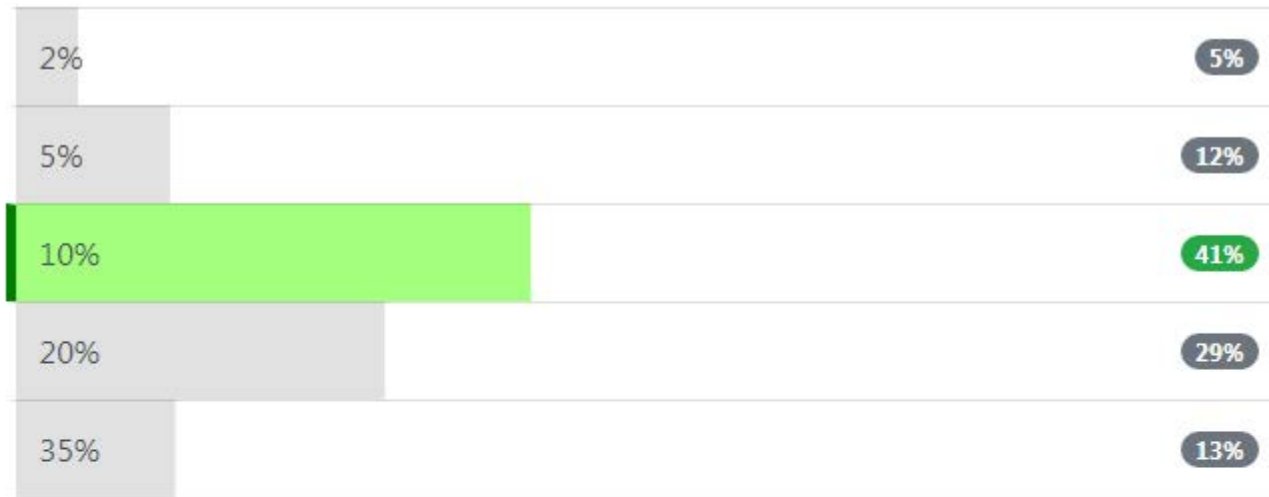
☐ 2%

☐ 5%

☐ 10%

☐ 20%

☐ 35%



In around 10% of patients subsequently diagnosed with lung cancer the chest x-ray was reported as normal

Important for me Less important

It is important not to get false reassurance from a normal chest x-ray report in patients with worrying symptoms (smoker with haemoptysis). This patient should have a CT scan to exclude a lung cancer.

Each one of the following predisposes to the development of obstructive sleep apnoea, except:

☐ Acromegaly

☐ Chronic obstructive pulmonary disease

☐ Amyloidosis

☐ Obesity

☐ Hypothyroidism



Sleep apnoea causes include obesity and macroglossia

Important for me Less important

The Sleep Heart Health Study showed that when these two conditions do coexist, this is the result of chance alone

A 65-year-old man presents with progressive shortness-of-breath. On examination he is found to have fine crackles in both lung bases and oxygen saturations of 93% on room air. A diagnosis of idiopathic pulmonary fibrosis is suspected. Which one of the following chest x-ray findings develops first in patients with idiopathic pulmonary fibrosis?

- ☐ Asymmetrical upper zone 'ground-glass' changes
- ☐ Small, peripheral opacities in the lower zones
- ☐ Perihilar horizontal septal lines
- ☐ Honeycombing
- ☐ Loss of left heart border

Asymmetrical upper zone 'ground-glass' changes

18%

Small, peripheral opacities in the lower zones

54%

Perihilar horizontal septal lines

10%

Honeycombing

14%

Loss of left heart border

4%

Honeycombing is a late feature of idiopathic pulmonary fibrosis.

You are asked to interpret the post-bronchodilator spirometry results of a 56-year-old woman who has been complaining of progressive shortness-of-breath.

FEV1/FVC	0.60
FEV1% predicted	60%

What is the most appropriate interpretation of these results?

- ☐ Poor technique - repeat spirometry
- ☐ Asthma
- ☐ COPD (stage 1 - mild)
- ☐ COPD (stage 2 - moderate)
- ☐ Pulmonary fibrosis

Poor technique - repeat spirometry

6%

Asthma

8%

COPD (stage 1 - mild)

23%

COPD (stage 2 - moderate)

54%

Pulmonary fibrosis

9%

A 66-year-old man with a history of chronic obstructive pulmonary disease (COPD) is referred by his GP to the Rapid Access Chest Clinic. He was recently treated with several courses of antibiotics and steroids for an exacerbation of COPD which failed to completely resolve. A chest x-ray was reported as follows:

There is a suspicious 3cm mass in the right hilum. Background changes of COPD. Urgent referral to the chest clinic is advised.

Report faxed to GP

Recent blood tests are also reviewed:

Hb	14.2 g/dl
Platelets	$323 \times 10^9/l$
WBC	$9.1 \times 10^9/l$

Na ⁺	128 mmol/l
K ⁺	3.9 mmol/l
Urea	6.4 mmol/l
Creatinine	99 μ mol/l

On examination there is no evidence of clubbing. Examination of chest demonstrates a fixed monophonic wheeze in the right lung. What is the most likely underlying cause?

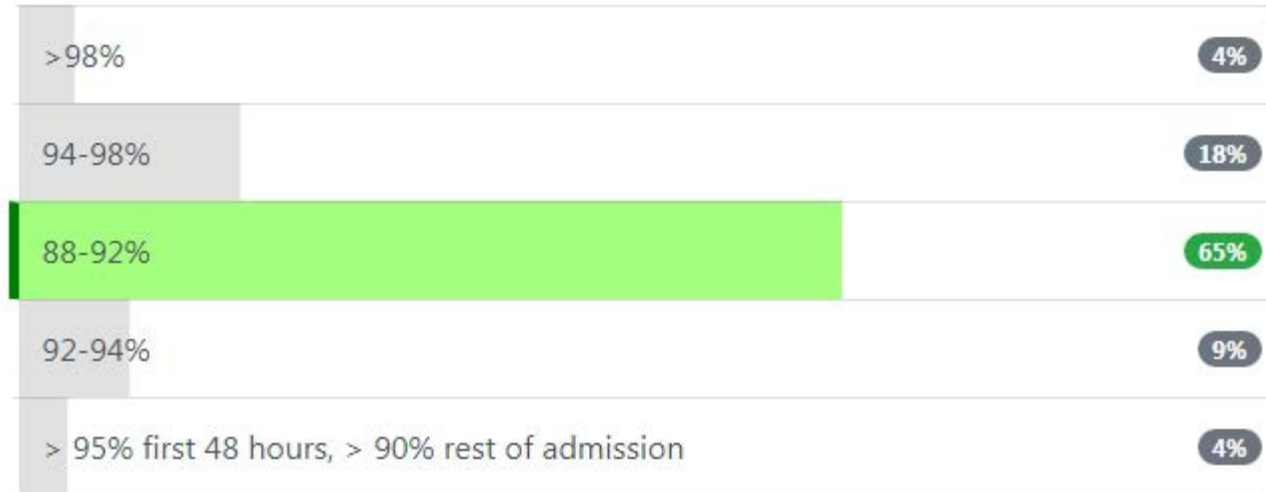
- ☐ Tuberculosis
- ☐ Sarcoidosis
- ☐ Squamous cell lung cancer
- ☐ Small cell lung cancer
- ☐ Lymphoma



The presence of hyponatraemia strongly points towards a diagnosis of small cell lung cancer.

A 70-year-old man who is known to have chronic obstructive pulmonary disease (COPD) is admitted to the Medical Admissions Unit with a suspected infective exacerbation of COPD. What should the target oxygen saturations be until blood gases are available?

- ☐ >98%
- ☐ 94-98%
- ☐ 88-92%
- ☐ 92-94%
- ☐ > 95% first 48 hours, > 90% rest of admission



The 2017 British Thoracic Society guidelines state the following:

For most patients with known COPD or other known risk factors for hypercapnic respiratory failure (eg, morbid obesity, CF, chest wall deformities or neuromuscular disorders or fixed airflow obstruction associated with bronchiectasis), a target saturation range of 88–92% is suggested pending the availability of blood gas results (grade A for COPD, grade D for other conditions).

A 45-year-old woman who is known to have systemic lupus erythematosus (SLE) is referred to the respiratory clinic with increased shortness-of-breath. A number of investigations are ordered including transfer factor of the lung for carbon monoxide (TLCO), which is elevated. Which one of the following respiratory complications of SLE is associated with this finding?

- ☐ Acute lupus pneumonitis
- ☐ Pulmonary hypertension
- ☐ Alveolar haemorrhage
- ☐ Respiratory muscle weakness
- ☐ Pulmonary embolism

Acute lupus pneumonitis

9%

Pulmonary hypertension

12%

Alveolar haemorrhage

64%

Respiratory muscle weakness

5%

Pulmonary embolism

9%

A 27-year-old man with a history of 'brittle' asthma is admitted to the Emergency Department with an asthma attack. The paramedics have already administered high-flow oxygen and nebulised salbutamol. He is unable to complete sentences, has a tight bilateral expiratory wheeze and is unable to perform a peak flow reading. His respiratory rate is 30 / minute, sats 94% (on high-flow oxygen) and pulse 120 / minute. He is immediately given intravenous hydrocortisone and nebulised salbutamol is given continuously. After five minutes there is no improvement and intravenous magnesium sulphate is given. After another five minutes an arterial blood gas sample is taken:

pH	7.34
pCO ₂	6.9 kPa
pO ₂	8.8 kPa

What is the most appropriate management?

- ☐ Non-invasive ventilation
- ☐ Add intravenous aminophylline
- ☐ Give a further bolus of intravenous hydrocortisone
- ☐ Add nebulised ipratropium bromide and review in 10 minutes
- ☐ Intubation

Non-invasive ventilation

31%

Add intravenous aminophylline

10%

Give a further bolus of intravenous hydrocortisone

2%

Add nebulised ipratropium bromide and review in 10 minutes

5%

Intubation

53%

This question is about clinical judgement. A review of the British Thoracic Society guidelines will show that in such a scenario nebulised ipratropium bromide should have been given much earlier but this did not happen. The above arterial blood gas results for a young asthmatic patient are alarming and suggest that he is rapidly becoming tired. It is therefore inappropriate to wait a further 10 minutes. This patient's needs ITU input with probable intubation and ventilation.

Which one of the following pathophysiological changes is most responsible for emphysema?

- ☐ Mucosal oedema and mucus plugging
- ☐ Destruction of alveolar walls secondary to proteinases
- ☐ Airway hypersensitivity
- ☐ Smooth muscle contraction
- ☐ Hypertrophy of mucous secreting glands

Mucosal oedema and mucus plugging

7%

Destruction of alveolar walls secondary to proteinases

84%

Airway hypersensitivity

2%

Smooth muscle contraction

2%

Hypertrophy of mucous secreting glands

4%

Proteinases such as elastase cause irreversible damage to the supporting connective tissue of the alveolar septa. Smoking accelerates this process.

You are considering prescribing varenicline to a 45-year-old man who is trying to stop smoking. Which one of the following conditions is most likely to contradict the prescription of varenicline?

- ☐ Previous or current central nervous system tumour
- ☐ Past history of deliberate self-harm
- ☐ Hypertension
- ☐ Myasthenia gravis
- ☐ Obesity

Previous or current central nervous system tumour	9%
Past history of deliberate self-harm	69%
Hypertension	7%
Myasthenia gravis	11%
Obesity	4%

Varenicline should be used with caution in patients with a history of depression. There are ongoing studies looking at the risk of suicidal behaviour in patients taking varenicline.

The current MHRA/CHM advice is:

Suicidal behaviour and varenicline

Patients should be advised to discontinue treatment and seek prompt medical advice if they develop agitation, depressed mood, or suicidal thoughts. Patients with a history of psychiatric illness should be monitored closely while taking varenicline.

In the current BNF:

Cautions

risk of relapse, irritability, depression, and insomnia on discontinuation (consider dose tapering on completion of 12-week course); history of psychiatric illness (may exacerbate underlying illness including depression); predisposition to seizures, including conditions that may lower seizure threshold; history of cardiovascular disease

A 76-year-old woman is currently being treated with antibiotics in hospital for a urinary tract infection. Over the last few days, she has developed a cough with productive sputum and is feeling very nauseous. She is also a known alcoholic with difficult social circumstances. A chest X-ray is carried out which shows bilateral cavitating opacities in the upper lobe. What is the most likely causative organism of this clinical picture?

- ☐ *Klebsiella pneumoniae*
- ☐ *Pseudomonas aeruginosa*
- ☐ *Mycoplasma pneumoniae*
- ☐ *Legionella pneumophila*
- ☐ *Staphylococcus aureus*

<i>Klebsiella pneumoniae</i>	71%
<i>Pseudomonas aeruginosa</i>	7%
<i>Mycoplasma pneumoniae</i>	8%
<i>Legionella pneumophila</i>	5%
<i>Staphylococcus aureus</i>	9%

Klebsiella most commonly causes a cavitating pneumonia in the upper lobes, mainly in diabetics and alcoholics

Important for me Less important

This patient has several of the risk factors linked with the *Klebsiella* infection such as her age, recent visit to the hospital due to infection and social history. This is backed up with her chest X-ray which shows characteristic signs of *Klebsiella* infection.

Pseudomonas aeruginosa is a common pathogen in bronchiectasis and cystic fibrosis. It is a common cause of hospital-acquired pneumonia, especially in those patients in the ITU on a ventilator. It doesn't cause the X-ray changes seen in this scenario. Instead, 'ground-glass' attenuation can often be noticed on a CT scan.

Mycoplasma pneumoniae causes flu-like symptoms such as a headache, arthralgia and myalgia followed by a dry cough which are not seen in this case. Chest X-ray often shows patchy consolidation of one lower lobe.

Legionella pneumophila also causes flu-like symptoms such as fever, myalgia. It can also cause extra-pulmonary symptoms such as hepatitis, diarrhea and vomiting. Bi-basal consolidation can be seen on chest X-ray.

Staphylococcus aureus is often seen in intravenous drug users (IVDU), young, elderly or people with an underlying disease such as leukemia or cystic fibrosis. The patient's history of alcoholism points more towards *Klebsiella*

A 24-year-old female comes for review. She was diagnosed with asthma two years ago and is currently using a salbutamol inhaler 100mcg prn combined with beclometasone dipropionate inhaler 200mcg bd. Despite this her asthma is not well controlled. On examination her chest is clear and she has a good inhaler technique. Following NICE guidance, what is the most appropriate next step in management?

- ☐ Increase beclometasone dipropionate to 400mcg bd
- ☐ Switch steroid to fluticasone propionate
- ☐ Add a leukotriene receptor antagonist
- ☐ Add salmeterol
- ☐ Add tiotropium

Increase beclometasone dipropionate to 400mcg bd

11%

Switch steroid to fluticasone propionate

2%

Add a leukotriene receptor antagonist

75%

Add salmeterol

10%

Add tiotropium

3%

Following NICE 2017, patients with asthma who are not controlled with a SABA + ICS should first have a LTRA added, not a LABA

Important for me Less important

A 45-year-old man with end-stage emphysema due to alpha-1 antitrypsin deficiency is reviewed by the respiratory team. He is currently breathless walking 100m and struggles with many of his activities of daily living. Which of the following treatments may be used as a treatment in this case?

- ☐ Insert a long term chest drain
- ☐ Lung volume reduction surgery
- ☐ Lung volume expansion surgery
- ☐ Pneumonectomy
- ☐ Tracheotomy

Insert a long term chest drain	3%
Lung volume reduction surgery	74%
Lung volume expansion surgery	10%
Pneumonectomy	10%
Tracheotomy	3%

Lung volume reduction surgery can be used in the treatment of alpha-1 antitrypsin deficiency

Important for me Less important

This question is asking about the late stage treatment of alpha 1-antitrypsin deficiency. For respiratory management, it is similar to that of late stage chronic obstructive pulmonary disease (COPD). Therefore of the above options, lung volume reduction surgery is the correct answer.

Lung volume reduction surgery removes the worst affected part of the lungs in order to improve airflow and alveolar gas exchange in the remaining portion of the lung.

Inserting a chest drain or tracheostomy will not aid his symptoms, neither will a pneumonectomy.

Lung volume expansion surgery is not a real thing.

A 29-year-old woman who is 14 weeks pregnant presents to the Emergency Department with an exacerbation of asthma. She quickly settles with nebulised salbutamol and you are asked to review her prior to discharge. She currently only uses a salbutamol inhaler (100mcg) as required and thinks that the most common trigger is grass pollen. Her peak flow is now 380 l/min (predicted 440 l/min) and inhaler technique is good. What is the most appropriate course of action?

- ☐ Add inhaled ipratropium bromide 500mcg qds
- ☐ Suggest she uses the salbutamol 100mcg qds
- ☐ Arrange a course of pollen desensitisation injections
- ☐ Add inhaled salmeterol 50mcg bd
- ☐ Add inhaled beclomethasone 200mcg bd

Add inhaled ipratropium bromide 500mcg qds

6%

Suggest she uses the salbutamol 100mcg qds

6%

Arrange a course of pollen desensitisation injections

8%

Add inhaled salmeterol 50mcg bd

9%

Add inhaled beclomethasone 200mcg bd

70%

Adult with asthma not controlled by a SABA - add a low-dose ICS

Important for me Less important

The British Thoracic Society (BTS) guidelines make it clear that short-acting /long-acting beta 2-agonists, inhaled and oral corticosteroids should all be used as normal during pregnancy.

What is the typical vital capacity in a male?

☐ 300 ml

☐ 500 ml

☐ 1,500 ml

☐ 2,500 ml

☐ 4,500 ml

300 ml

4%

500 ml

18%

1,500 ml

18%

2,500 ml

18%

4,500 ml

43%

Vital capacity - 4,500ml in males, 3,500 mls in females

Important for me Less important

A patient with poorly controlled asthma is started on montelukast. What is the mechanism of action of this drug?

- ☐ Beta-2 receptor antagonist
- ☐ Beta-2 receptor agonist
- ☐ Leukotriene receptor agonist
- ☐ Leukotriene receptor antagonist
- ☐ Phosphodiesterase type-4 inhibitor

Beta-2 receptor antagonist

1%

Beta-2 receptor agonist

1%

Leukotriene receptor agonist

10%

Leukotriene receptor antagonist

85%

Phosphodiesterase type-4 inhibitor

2%

A couple is being investigated in a fertility clinic due to difficulty with conceiving. They have been engaging in regular unprotected sexual intercourse for 24 months with no success. The woman (aged 25) has been extensively investigated with no structural or hormonal abnormality found.

As part of the investigations of the man (aged 26), semen analysis revealed oligospermia with immotile live sperms. He also reports recurrent chest infections for the past 15 years, a sweat test was performed 10 years ago revealing no abnormality. A testicular examination was normal. A chest examination revealed quiet heart sounds and generalised crepitations and wheeze throughout the lung fields. There were no abnormalities on hormonal analysis.

What is the most likely cause of this man's infertility?

- ☐ Cystic fibrosis
- ☐ Kartagener's syndrome
- ☐ Klinefelter's syndrome
- ☐ Orchitis
- ☐ Varicocele

Cystic fibrosis

20%

Kartagener's syndrome

68%

Klinefelter's syndrome

6%

Orchitis

3%

Varicocele

2%

Recurrent chest infections + subfertility - think primary ciliary dyskinesia syndrome (Kartagener's syndrome)

Important for me Less important

Primary ciliary dyskinesia or Kartagener's syndrome are characterised by reduced cilia motility throughout the body. This results in recurrent chest infections and bronchiectasis but also can result in male infertility. When Primary ciliary dyskinesia (PCD) is associated with situs inversus (resulting in the quiet heart sounds), it is known as Kartagener's syndrome, however, this only happens in 50% of PCD. This presentation of symptoms is similar to cystic fibrosis however the negative sweat test ruled out this differential. The normal testicular examination ruled out a varicocele and the normal hormonal analysis ruled out Klinefelter's syndrome.

A 63-year-old man presents to the respiratory out-patients department with shortness of breath. Investigations reveal a fibrosing lung disease. A sputum sample however is positive for acid-fast bacilli. Which of the following may have predisposed him to developing tuberculosis?

- ☐ Cadmium
- ☐ Coal dust
- ☐ White asbestos fibres
- ☐ Blue asbestos fibres
- ☐ Silica

Cadmium

9%

Coal dust

11%

White asbestos fibres

11%

Blue asbestos fibres

14%

Silica

56%

You are reviewing a man with haemoptysis in the rapid-access lung clinic. Which one of the following is the most significant risk factor for developing lung cancer?

- ☐ Cryptogenic fibrosing alveolitis
- ☐ Asbestos exposure for most of working life
- ☐ 10 year period of smoking 'crack' cocaine 20 years ago
- ☐ 30 pack-year history of smoking
- ☐ 20 year history of recreational cannabis use

Cryptogenic fibrosing alveolitis

4%

Asbestos exposure for most of working life

21%

10 year period of smoking 'crack' cocaine 20 years ago

5%

30 pack-year history of smoking

68%

20 year history of recreational cannabis use

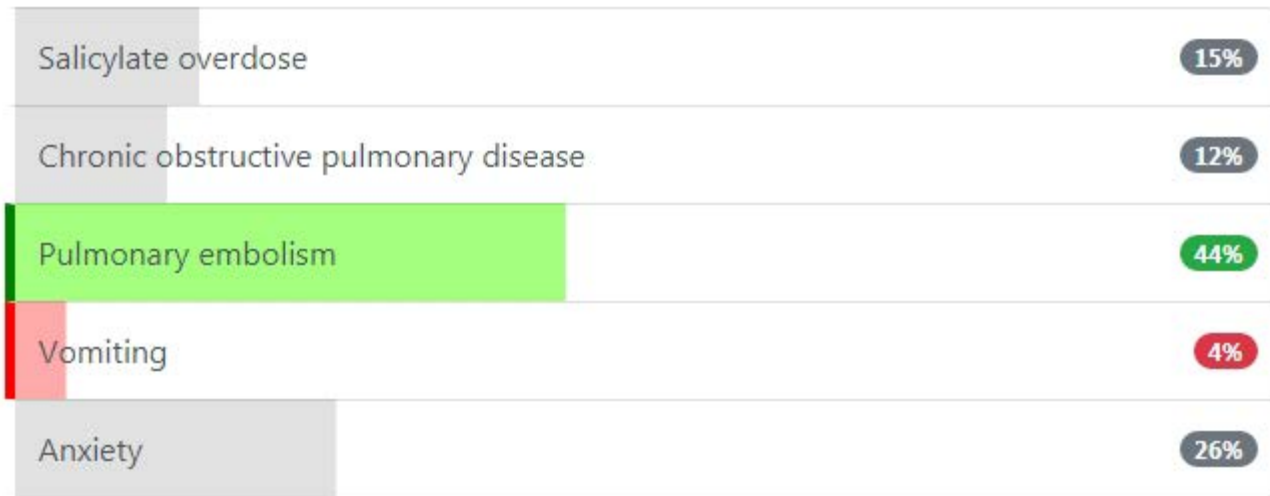
3%

A 45-year-old female with a 30 pack-year history of smoking is admitted to the Emergency Department with shortness of breath. Arterial blood gases taken on room air are as follows:

pH	7.49
pCO ₂	2.9 kPa
pO ₂	8.8 kPa

Which one of the following is the most likely diagnosis?

- ☐ Salicylate overdose
- ☐ Chronic obstructive pulmonary disease
- ☐ Pulmonary embolism
- ☐ Vomiting
- ☐ Anxiety



Pulmonary embolism needs to be excluded. Even with a significant smoking history a reduced pO_2 should not be attributed to anxiety. A salicylate overdose would not account for a reduced pO_2 , unless it is severe enough to have caused pulmonary oedema. This option is much less likely than a pulmonary embolism

Anxiety would not cause a reduced pO_2 .

A 19-year-old man presents as he is concerned he may be asthmatic. Which one of the following points in the history would make this diagnosis less likely?

- ☐ Smoking since age of 16 years
- ☐ Peripheral tingling during episodes of dyspnoea
- ☐ Peripheral blood eosinophilia
- ☐ Chest tightness whilst exercising
- ☐ History of eczema

Smoking since age of 16 years	25%
Peripheral tingling during episodes of dyspnoea	59%
Peripheral blood eosinophilia	7%
Chest tightness whilst exercising	5%
History of eczema	5%

The British Thoracic Society suggest peripheral tingling is one of the factors which makes a diagnosis of asthma less likely. His smoking history does not preclude a diagnosis of asthma and COPD would be very unlikely given his age.

Hilary is a 69-year-old woman who attends her GP with muscle weakness and blurred vision. She works as a cleaner, drinks about 18 units of alcohol a week and has smoked about 20 cigarettes a day for 30 years.

On examination her blood pressure is elevated to 150/97 mmHg. There are reduced breath sounds over the region of the left lower lobe. Some of her bloods are shown below:

Hb	125 g/L
WCC	8.9×10^9 cells/L
Plts	434×10^9 /L
Urea	8.2 mmol/l
Creatinine	152 μ mol/l
Na	149 mmol/l
K	3.0 mmol/l
24-hour urine free cortisol	256 μ g/l (10-100 μ g/l)
Glucose	18.2 mmol/l

She explains that, other than a persistent smoker's cough, which is occasionally productive of blood, she is otherwise well.

What is the most likely diagnosis?

- ☐ Squamous cell lung carcinoma
- ☐ Cushing's disease
- ☐ Small cell lung carcinoma
- ☐ Adrenal adenoma
- ☐ Adenocarcinoma of the lung

Squamous cell lung carcinoma

18%

Cushing's disease

6%

Small cell lung carcinoma

67%

Adrenal adenoma

3%

Adenocarcinoma of the lung

6%

Small cell lung carcinoma secreting ACTH can cause Cushing's syndrome

Important for me Less important

This is a tough question but gets you to link different parts of the history and examination together with the blood test results. This woman has a paraneoplastic syndrome caused by ACTH release by a small cell lung cancer. Patient's with Cushing's syndrome due to lung malignancy often don't present with typical morphological changes you would otherwise expect (e.g. buffalo hump etc.). Her muscle weakness can be explained by hypokalaemia and her blurred vision by hyperglycaemia (both typical symptoms).

Squamous cell lung carcinoma - This is not the most appropriate answer. Although the history and examination findings point to lung carcinoma, it is small cell lung cancer which is most commonly associated with ACTH and Cushing's syndrome.

Cushing's disease - This is not the most appropriate answer. Although this patient has a raised cortisol level, there is no evidence to suggest it is due to a pituitary adenoma. It is important to understand the difference between Cushing's disease (a pituitary adenoma) and Cushing's syndrome (the symptoms associated with a high cortisol level, of any cause).

Small cell lung carcinoma - This is the correct answer. This lady is likely to have lung cancer given her smoking history, smoker's cough and reduced breath sounds over a certain area of the lung. Of the types of lung cancer, small cell carcinoma is most commonly associated with ACTH secretion and Cushing's syndrome.

Adrenal adenoma - This is not the most appropriate answer. Although this can explain the blood test results seen in this lady, it is less likely when you consider her smoking history, symptoms and examination findings.

Adenocarcinoma of the lung - This is not the most appropriate answer. Although the history and examination findings point to lung carcinoma, it is small cell lung cancer which is most commonly associated with ACTH and Cushing's syndrome.

A 60-year-old woman with normally well-controlled chronic obstructive pulmonary disease (COPD) was brought in by ambulance breathless and wheezy. On arrival to the emergency department, her oxygen saturations are 86% on room air and her respiratory rate is 36 breaths per minute. An arterial blood gas (ABG) sample was taken and the results are below:

ABG on room air:

pH	7.33
pO ₂	7.2 kPa
pCO ₂	6.5 kPa

She was given 200mg intravenous hydrocortisone, repeated doses of nebulised salbutamol and ipratropium bromide and oxygen via a 28% venturi mask at 4L/min. An arterial blood gas sample was taken 1 hour later and the results are below:

ABG on 28% oxygen via venturi mask:

pH	7.29
pO ₂	7.7 kPa
pCO ₂	7.1 kPa

What is the next most appropriate step regarding oxygen therapy?

- ☐ Stop the oxygen therapy
- ☐ Increase the oxygen flow to 6L/min via a 31% venturi mask
- ☐ Commence non-invasive ventilation (NIV)
- ☐ Intubate and ventilate the patient
- ☐ Continue to give oxygen via a 28% venturi mask at 4L/min and nebulised bronchodilators and repeat the ABG after 1 hour

Stop the oxygen therapy	6%
Increase the oxygen flow to 6L/min via a 31% venturi mask	4%
Commence non-invasive ventilation (NIV)	72%
Intubate and ventilate the patient	14%
Continue to give oxygen via a 28% venturi mask at 4L/min and nebulised bronchodilators and repeat the ABG after 1 hour	5%

NIV (BiPAP) is indicated in respiratory acidosis or rising PaCO₂ resistant to best medical management during an acute exacerbation of COPD

Important for me Less important

1: The patient is hypoxic and requires oxygen.

2: Increasing the oxygen flow rate will worsen the CO₂ retention and acidosis.

3: This is the correct answer. Acidosis (pH <7.35), rising pCO₂ or a respiratory rate >30 breaths per minute despite best medical management (steroids, nebulised bronchodilators and standard oxygen therapy) is an indication for non-invasive ventilation.

4: Intubation and ventilation are generally considered if the pH is below 7.26 or the pCO₂ is rising on non-invasive ventilation (NIV).

5: The repeat blood gas is worse than the previous so the current oxygen therapy is not working. The patient has already received 1 hour of best medical management.

A 62-year-old man with a history of recurrent lower respiratory tract infections is diagnosed as having bilateral bronchiectasis following a high resolution CT scan. Which one of the following is most important in the long term control of his symptoms?

☐ Inhaled corticosteroids

☐ Prophylactic antibiotics

☐ Surgery

☐ Postural drainage

☐ Mucolytic therapy

Inhaled corticosteroids

10%

Prophylactic antibiotics

16%

Surgery

5%

Postural drainage

51%

Mucolytic therapy

18%

Symptom control in non-CF bronchiectasis - inspiratory muscle training + postural drainage

Important for me Less important

A 35-year-old patient with a history of asthma and epilepsy presents with haemoptysis and a worsening of his asthma. Blood tests reveal an eosinophilia and a positive pANCA. Which of the following drugs is most likely to have precipitated the likely diagnosis?

- ☐ Montelukast
- ☐ Phenytoin
- ☐ Sodium valproate
- ☐ Prednisolone
- ☐ Sodium cromoglycate

Montelukast	68%
Phenytoin	11%
Sodium valproate	10%
Prednisolone	4%
Sodium cromoglycate	6%

Leukotriene receptor antagonists may trigger eosinophilic granulomatosis with polyangiitis (Churg-Strauss syndrome)

Important for me Less important

This patient probably has Churg-Strauss syndrome, which is associated with the use of leukotriene receptor antagonists

A 65-year-old life-long smoker with a significant past history of asbestos exposure is investigated for lung cancer. Given his history of both smoking and asbestos exposure, what is his increased risk of lung cancer?

- ☐ 5
- ☐ 10
- ☐ 50
- ☐ 500
- ☐ 1,000



Smoking and asbestos are synergistic, i.e. a smoker with asbestos exposure has a $10 * 5 = 50$ times increased risk

A 47-year-old man is seen in the respiratory clinic. He has been referred due to progressive shortness of breath. A CT scan showed emphysematous changes in the lungs. As he has never smoked alpha 1-antitrypsin levels were ordered and reported to be 10% of normal. What is the most likely genotype of this patient?

☐ PiZZ

☐ PiSS

☐ PiMS

☐ PiMM

☐ PiMZ

PiZZ

56%

PiSS

11%

PiMS

10%

PiMM

7%

PiMZ

16%

A 30-year-old female with a past history of asthma presents to the Emergency Department with pleuritic chest pain. Chest x-ray shows a right-sided pneumothorax with a 1.5cm rim of air and no mediastinal shift. What is the most appropriate management?

- ☐ Admit for 48 hours observation
- ☐ Intercostal drain insertion
- ☐ Aspiration
- ☐ Discharge
- ☐ Immediate 14G cannula into 2nd intercostal space, mid-clavicular line

Admit for 48 hours observation

19%

Intercostal drain insertion

12%

Aspiration

40%

Discharge

20%

Immediate 14G cannula into 2nd intercostal space, mid-clavicular line

9%

This should be treated as a secondary pneumothorax as the patient has a history of asthma

Dr Assem

Which one of the following is least associated with small cell lung cancer?

- ☐ Bad prognosis
- ☐ Cushing's syndrome
- ☐ PTH-related peptide secretion
- ☐ Hyponatraemia
- ☐ Lambert-Eaton syndrome

Bad prognosis

8%

Cushing's syndrome

15%

PTH-related peptide secretion

56%

Hyponatraemia

10%

Lambert-Eaton syndrome

11%

Paraneoplastic features of lung cancer

- squamous cell: PTHrp, clubbing, HPOA
- small cell: ADH, ACTH, Lambert-Eaton syndrome

Important for me Less important

PTH-related peptide secretion is seen in squamous cell lung cancer

Dr Assem

A 35-year-old female presents with increasing fatigue, shortness of breath and pulmonary oedema. Chest x-ray has revealed cardiomegaly with evidence of increased pulmonary artery pressure on echocardiogram.

The patient undergoes right-sided heart catheterisation. A pulmonary artery pressure at rest greater than what value would be considered diagnostic of pulmonary arterial hypertension?

☐ 15 mmHg

☐ 20 mmHg

☐ 25 mmHg

☐ 30 mmHg

☐ 35 mmHg

15 mmHg

7%

20 mmHg

9%

25 mmHg

65%

30 mmHg

11%

35 mmHg

8%

Pulmonary arterial hypertension is defined as an elevated pulmonary arterial pressure of greater than 25mmHg at rest or 30mmHg after exercise

Important for me [Less important](#)

A pulmonary arterial pressure of greater than 25 mmHg at rest is diagnostic of pulmonary arterial hypertension, making option 3 the correct answer.

Option 4, 30 mmHg would have been correct, had the questions asked for pulmonary arterial pressure after exercise.

Options 1, 2 and 5 are incorrect.

Dr Assem

A 34-year-old man is climbing Mount Kilimanjaro. For the past two days he has complained of nausea and a headache. The climbing team is now at an altitude of 4,500m when he develops shortness of breath and a pink frothy cough. Examination reveals bibasal crackles. What is the most appropriate treatment, other than descent?

☐ Nifedipine

☐ Frusemide

☐ Mannitol

☐ Hydralazine

☐ Third-generation cephalosporin

Nifedipine

54%

Furosemide

20%

Mannitol

16%

Hydralazine

7%

Third-generation cephalosporin

2%

This man has developed high altitude pulmonary oedema (HAPE) and should to be treated with prompt descent, oxygen and nifedipine if it is available. Other options for treating HAPE include dexamethasone, acetazolamide and phosphodiesterase type V inhibitors.

A 31-year-old man with a history of asthma presents to the Emergency Department with dyspnoea not responding to his salbutamol inhaler. On examination he is noted to have reduced breath sounds on the right side and a chest x-ray confirms a pneumothorax with a 1.5cm rim of air. A pleural aspiration is performed and the patient's dyspnoea resolves. What advice should he be given before discharge?

- ☐ Air travel should be avoided for the next 12 months
- ☐ His asthma treatment should be increased to the next step on the British Thoracic Society guidelines
- ☐ Playing wind instruments such as the trombone should be avoided for the next 12 months
- ☐ Scuba diving should be avoided for life
- ☐ Vigorous exercise should be avoided for the next 3 months

Air travel should be avoided for the next 12 months	6%
His asthma treatment should be increased to the next step on the British Thoracic Society guidelines	10%
Playing wind instruments such as the trombone should be avoided for the next 12 months	4%
Scuba diving should be avoided for life	71%
Vigorous exercise should be avoided for the next 3 months	9%

This man has developed a secondary spontaneous pneumothorax. The British Thoracic Society (BTS) guidelines state: *'Diving should be permanently avoided unless the patient has undergone bilateral surgical pleurectomy and has normal lung function and chest CT scan postoperatively.'*

Air travel is acceptable once the pneumothorax has fully resolved.

A 35-year-old female with sarcoidosis is started on a course of prednisolone. Which one of the following is a suitable indication for commencing steroid therapy in such patients?

☐ Bilateral hilar lymphadenopathy

☐ Arthralgia

☐ Hypercalcaemia

☐ Serum ACE > 120 u/l

☐ Erythema nodosum

Bilateral hilar lymphadenopathy

13%

Arthralgia

12%

Hypercalcaemia

52%

Serum ACE > 120 u/l

10%

Erythema nodosum

14%

You are called to review a 19-year-old woman with asthma who presented to the emergency department (ED) approximately 30 minutes ago with acute shortness of breath. She is well known to staff and has had 2 previous ITU admissions for her asthma.

At initial presentation in ED she was tachycardic at 126bpm, normotensive, with a respiratory rate (RR) of 30 and saturating at 94% on 4L/min oxygen via face mask. On clerking doctor noted widespread polyphonic wheeze on auscultation of the chest. The following bloods were obtained at the time of presentation:

Hb 117 g/l	Na ⁺ 138 mmol/l
Platelets 350 * 10 ⁹ /l	K ⁺ 4.0 mmol/l
WBC 10.2* 10 ⁹ /l	Urea 6.5 mmol/l
Creatinine 98 µmol/l	
CRP 50 mg/l	
Eosin 0.45 * 10 ⁹ /l	

Chest X-ray showed no acute abnormality.

Peak Flow was 40% predicted.

Initial arterial blood gas (ABG) on 4L/min oxygen:

pH 7.45 mmol/l
pCO2 3.6 mmol/l
pO2 14.3 mmol/l
HCO3 20 mmol/l
Lactate 1.5 mmol/l

The F2 started treatment for acute severe asthma. She has been given back-to-back salbutamol and ipratropium nebulisers, IV hydrocortisone and IV magnesium sulphate.

On your arrival, the patient is the in the resuscitation suite. The F2 informs you that they have attempted to perform a repeat ABG but were unable to obtain a sample as the patient is confused and combative. As a result, they also cannot provide a meaningful repeat peak flow reading. The patient's vital signs are largely unchanged since initial presentation, she is maintaining saturations of 95% on 4L/min (via facemask), with a RR of 27, HR 130 and she is normotensive. ECG is difficult to interpret but does show sinus tachycardia. On auscultation of the chest you hear a widespread polyphonic wheeze.

Given the limited information you have, what is the most appropriate immediate action?

☐ Obtain a repeat ABG
☐ IV salbutamol
☐ Aminophylline infusion
☐ Referral to intensive care
☐ Nebulised magnesium sulphate

Obtain a repeat ABG	7%
IV salbutamol	14%
Aminophylline infusion	12%
Referral to intensive care	59%
Nebulised magnesium sulphate	7%

Confusion in an asthma attack is a life-threatening feature

Important for me Less important

This patient has life-threatening asthma and has not responded despite optimal management, she needs an urgent review by ITU as she may need invasive ventilatory support.

The key detail here is that the patient is confused/combative. You've been given limited quantitative information that we'd normally use to determine treatment response and severity BUT remember that confusion is a life-threatening feature and by definition, therefore, this is a life-threatening attack warranting an ITU review.

The question hints that the confusion is new (within the 30 minutes since initial presentation) as the F2 is now unable to take a repeat ABG. This indicates that the patient is decompensating and this has occurred despite optimal management. The ceiling of care that can be offered outside of an ITU setting has been reached and so it is vital that she is reviewed by critical care.

1. Incorrect. Regardless of what the ABG shows, her confusion still makes this a life-threatening attack and she needs a referral to ITU.
2. Incorrect. IV salbutamol is often reserved for patients in whom the inhaled route cannot be used reliably. However, importantly, in life-threatening asthma it is the nebulised (oxygen-driven) route that is recommended.
3. Incorrect. IV aminophylline is not likely to result in any significant additional bronchodilation compared to standard care with inhaled bronchodilators and steroids.
4. Correct. This patient has life-threatening asthma and has failed to respond to optimal management. She needs urgent critical care review (likely with a view to invasive mechanical ventilation)
5. Incorrect. Nebulised magnesium is not recommended in the management of adults with acute severe asthma

A 60-year-old woman who has recently been diagnosed with chronic obstructive pulmonary disease (COPD) presents for review. She is still occasionally breathless despite using a short-acting muscarinic antagonist (SAMA) as required. Her FEV1 is 45% of predicted and she has managed to stop smoking. Looking at her past medical history, you see that she also has been diagnosed as being asthmatic in the past, but only required salbutamol as required when she was exercising. She last had a prescription for salbutamol 10 years ago.

Of the following options, which one is the most appropriate next step in management?

- ☐ Switch to a combined short-acting beta2-agonist and muscarinic antagonist inhaler (e.g. Combivent)
- ☐ Long-acting beta2-agonist
- ☐ Long-acting beta2-agonist + inhaled corticosteroid (ICS)
- ☐ Inhaled corticosteroid
- ☐ Use the SAMA regularly (e.g. 2 puffs qds)

Switch to a combined short-acting beta2-agonist and muscarinic antagonist inhaler (e.g. Combivent)

15%

Long-acting beta2-agonist

8%

Long-acting beta2-agonist + inhaled corticosteroid (ICS)

59%

Inhaled corticosteroid

14%

Use the SAMA regularly (e.g. 2 puffs qds)

5%

COPD - still breathless despite using SABA/SAMA and **asthma/steroid responsive features** → add a LABA + ICS

Important for me Less important

If patients with COPD don't respond to either short-acting beta-agonists (SABA) or short-acting muscarinic antagonist (SAMA) then further inhaler therapy is indicated. Following the 2018 NICE guidelines an assessment should be made whether there are '*asthmatic features/features suggesting steroid responsiveness*'. In this case there are - a previous diagnosis of asthma. Therefore, the next step is to add a long-acting beta2-agonist (LABA) and an inhaled corticosteroid (ICS).

A 43-year-old man is admitted due to shortness of breath and is noted to have a cavitating lesion on his chest x-ray. Which one of the following conditions is not part of the differential diagnosis?

- ☐ Lung cancer
- ☐ Pulmonary embolism
- ☐ Wegener's granulomatosis
- ☐ Churg-Strauss syndrome
- ☐ Tuberculosis

Lung cancer

4%

Pulmonary embolism

39%

Wegener's granulomatosis

8%

Churg-Strauss syndrome

44%

Tuberculosis

5%

You review a 60-year-old woman in the COPD clinic. She was diagnosed with COPD four years ago and is currently maintained on a salbutamol inhaler as required. She has recently managed to give up smoking and her latest FEV1 was 42% of predicted. Despite her current therapy she has frequent exacerbations. There is no history of asthma, eosinophilia or FEV1 variation.

What is the most appropriate next step in her management?

- ☐ Salmeterol inhaler
- ☐ Combined salmeterol + fluticasone inhaler
- ☐ Combined long acting beta agonist and long acting muscarinic antagonist (LABA/LAMA)
- ☐ Betamethasone inhaler
- ☐ Oral aminophylline

Salmeterol inhaler	10%
Combined salmeterol + fluticasone inhaler	16%
Combined long acting beta agonist and long acting muscarinic antagonist (LABA/LAMA)	60%
Betamethasone inhaler	11%
Oral aminophylline	3%

COPD - still breathless despite using SABA/SAMA and **no** asthma/steroid responsive features → add a LABA + LAMA

Important for me Less important

Following the 2018 NICE guidelines, the next step in management would be a combined long-acting beta2-agonist (such as salmeterol) + a long-acting muscarinic antagonist. This is because there are no '*asthmatic features/features suggesting steroid responsiveness*'.

A 45-year-old Afro-Caribbean lady presents to the dermatology department with several painful raised lesions on her shins. The only past medical history of note is asthma. She uses a salbutamol inhaler as required and takes the oral contraceptive pill.

A set of baseline investigations were performed:

Hb	132 g/l
Platelets	$374 \times 10^9/l$
WBC	$7.8 \times 10^9/l$

Na ⁺	142 mmol/l
K ⁺	3.9 mmol/l
Urea	5.5 mmol/l
Creatinine	67 µmol/l

Calcium	2.8 mmol/l
Phosphate	1.2 mmol/l
TSH	3.0 mIU/l
Free T4	12.6 pmol/l

A chest x-ray is reported as normal.

What is the most likely underlying diagnosis?

☒ Tuberculosis

☐ Oral contraceptive pill

☐ Graves disease

☐ Thyrotoxicosis

☐ Sarcoidosis

Tuberculosis	3%
Oral contraceptive pill	10%
Graves disease	5%
Thyrotoxicosis	4%
Sarcoidosis	79%

Sarcoidosis is the answer here. This is because this patient has erythema nodosum and a raised serum calcium. The history of asthma may also actually be due to sarcoid. Her age and ethnicity also make this the most likely diagnosis.

With normal normal thyroid function tests and no other signs, grave's disease is unlikely. Thyrotoxicosis would cause pre-tibial myxoedema not erythema nodosum.

TB and the oral contraceptive pill are less likely causes of erythema nodosum given a raised serum calcium.

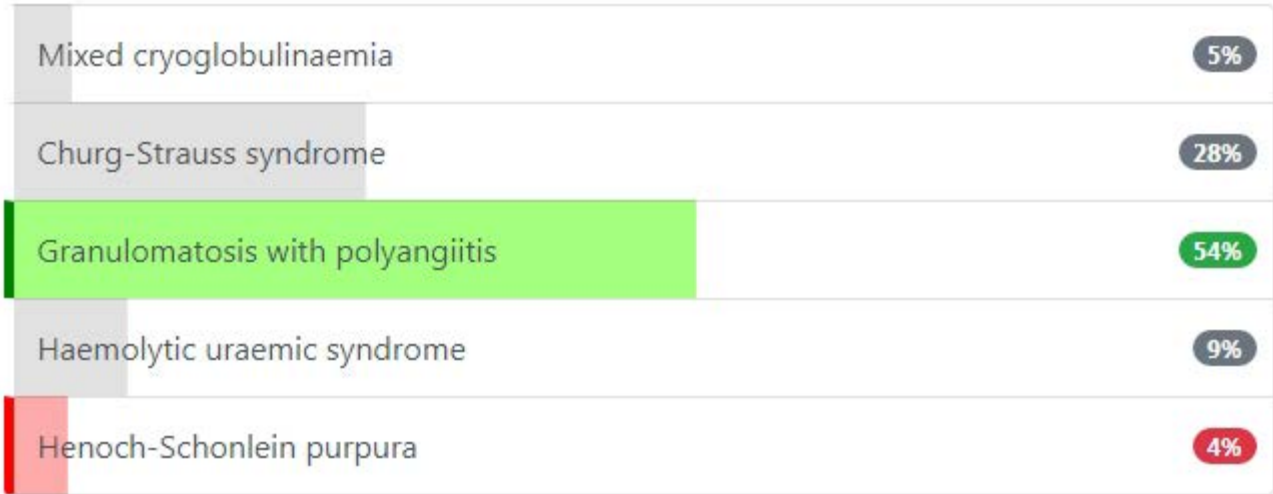
A 47-year-old man with a history of chronic sinusitis presents with shortness of breath to the Emergency Department. Initial investigations reveal:

Hb	10.4g/dl
Platelets	477 * 10 ⁹ /l
WCC	14.3 * 10 ⁹ /l
ESR	92 mm/h
Urea	20 mmol/l
Creatinine	198 µmol/l
Urine dipstick	blood +++

What is the most likely diagnosis?

- ☐ Mixed cryoglobulinaemia
- ☐ Churg-Strauss syndrome
- ☐ Granulomatosis with polyangiitis
- ☐ Haemolytic uraemic syndrome
- ☐ Henoch-Schonlein purpura

Dr Assem



The combination of pulmonary and renal involvement combined with a history of chronic sinusitis points towards a diagnosis of Granulomatosis with polyangiitis.

Which one of the following causes of lung fibrosis predominately affect the lower zones?

- ☐ Methotrexate
- ☐ Sarcoidosis
- ☐ Coal worker's pneumoconiosis
- ☐ Ankylosing spondylitis
- ☐ Extrinsic allergic alveolitis

Methotrexate

68%

Sarcoidosis

7%

Coal worker's pneumoconiosis

9%

Ankylosing spondylitis

6%

Extrinsic allergic alveolitis

10%

Lower zones lung fibrosis: methotrexate

Important for me Less important

A 32-year-old asthmatic woman is started on a new medication to control her asthma. Since this has happened, she has developed wrist-drop in her right arm and foot drop in her left leg. Bloods today are as follows:

Hb	143 g/l
Platelets	$287 \times 10^9/l$
WBC	$13.7 \times 10^9/l$
Neuts	$6.5 \times 10^9/l$
Lymphs	$3.2 \times 10^9/l$
Eosin	$4.0 \times 10^9/l$

Which medication may have precipitated this condition?

- ☐ Prednisolone
- ☐ Montelukast
- ☐ Salmeterol
- ☐ Cromoglicate
- ☐ Ipratropium

Dr Assem

Prednisolone	11%
Montelukast	68%
Salmeterol	3%
Cromoglicate	12%
Ipratropium	6%

Unmasking of Churg-Strauss syndrome: Montelukast

Important for me Less important

This is Churg-Strauss syndrome. This woman has presented with eosinophilia and a mononeuritis multiplex, which are classical findings.

It is thought that montelukast can unmask underlying Churg-Strauss syndrome, of which prior to treatment the only symptom was asthma.

A 43-year-old lifelong non-smoker is diagnosed as having emphysema. Further tests reveal that he has alpha-1 antitrypsin deficiency. What is the main role of alpha-1 antitrypsin in the body?

☐ Nicotinic receptor activator

☐ Protease inhibitor

☐ 5-alpha-reductase inhibitor

☐ Trypsin activator

☐ Phosphodiesterase inhibitor

Nicotinic receptor activator

3%

Protease inhibitor

78%

5-alpha-reductase inhibitor

5%

Trypsin activator

6%

Phosphodiesterase inhibitor

7%

A 24-year-old man is planning an expedition to the Andes. He asks for advice on preventing acute mountain sickness (AMS), other than gradual ascent. What is the most appropriate advice?

- ☐ Carbonic anhydrase inhibitor
- ☐ Non-steroid anti-inflammatories
- ☐ Ensure maximal physical fitness prior to trip
- ☐ Dexamethasone starting 2 days prior to arrival
- ☐ There is no evidence of any effective intervention to prevent AMS

Carbonic anhydrase inhibitor

55%

Non-steroid anti-inflammatories

3%

Ensure maximal physical fitness prior to trip

14%

Dexamethasone starting 2 days prior to arrival

9%

There is no evidence of any effective intervention to prevent AMS

19%

Acetazolamide, a carbonic anhydrase inhibitor, has an evidence to support its use in preventing AMS. Interestingly, there actually appears to be a positive correlation between physical fitness and the risk of developing AMS

A 24-year-old male with no past medical history presents to the Emergency Department with pleuritic chest pain. There is no history of a productive cough and he is not short of breath. Chest x-ray shows a right-sided pneumothorax with a 1 cm rim of air and no mediastinal shift. What is the most appropriate management?

- ☐ Immediate 14G cannula into 2nd intercostal space, mid-clavicular line
- ☐ Discharge with outpatient chest x-ray
- ☐ Aspiration
- ☐ Intercostal drain insertion
- ☐ Admit for 48 hours observation

Immediate 14G cannula into 2nd intercostal space, mid-clavicular line

2%

Discharge with outpatient chest x-ray

78%

Aspiration

8%

Intercostal drain insertion

2%

Admit for 48 hours observation

10%

It would of course be prudent to give advice about what he should do if his symptoms worsen and also suggest routine follow-up with his GP

A chest x-ray of a patient with sarcoidosis shows bilateral hilar lymphadenopathy but is otherwise normal. What chest x-ray stage does this correspond to?

☐ Stage 0

☐ Stage 1

☐ Stage 2

☐ Stage 3

☐ Stage 4

Stage 0

4%

Stage 1

69%

Stage 2

18%

Stage 3

6%

Stage 4

3%

Sarcoidosis CXR

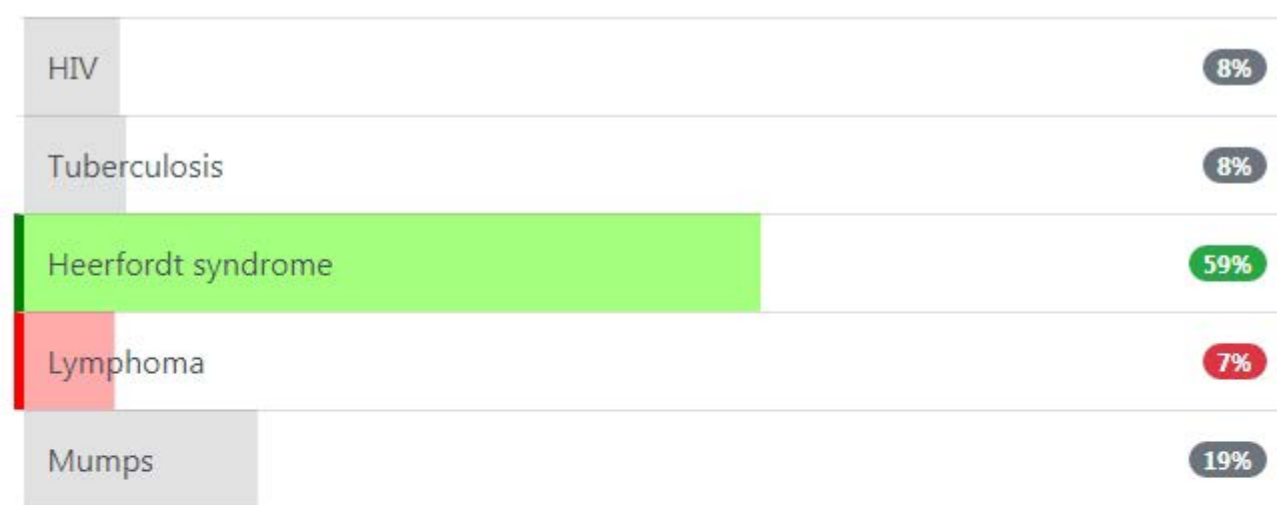
- 1 = BHL
- 2 = BHL + infiltrates
- 3 = infiltrates
- 4 = fibrosis

Important for me Less important

A 48-year-old Afro-Caribbean female is admitted with a fever and painful red eyes bilaterally. On examination, her temperature is 38.3°C, heart rate 85bpm, respiratory rate 26/min, and oxygen saturation 93% on room air. Closer examination reveals bilateral swelling of her parotid glands.

A chest x-ray is performed, which reveals bilateral hilar lymphadenopathy. What is the most likely unifying diagnosis?

- ☐ HIV
- ☐ Tuberculosis
- ☐ Heerfordt syndrome
- ☐ Lymphoma
- ☐ Mumps



Heerfordt syndrome is a subset of sarcoidosis: a combination of parotid enlargement, fever, and anterior uveitis.

In lymphoma and tuberculosis, you would expect there to be some reference to further B symptoms such as weight loss and night sweats. Mumps would not explain the hilar lymphadenopathy.

A 62-year-old woman with recently diagnosed chronic obstructive pulmonary disease (COPD) presents for review. Her FEV1 is 65% of the predicted value. She has managed to give up smoking and was prescribed a salbutamol inhaler to use as required. Despite this, she is still symptomatic and complains of wheeze and shortness of breath. There is no history of asthma, eosinophilia or FEV1 variation.

What is the most appropriate next step?

- ☐ Add an inhaled corticosteroid
- ☐ Add a combined long-acting beta2-agonist and long-acting muscarinic antagonist inhaler
- ☐ Refer for consideration of long-term oxygen therapy
- ☐ Add a long-acting beta2-agonist
- ☐ Add a combination long-acting beta2-agonist and corticosteroid inhaler

Add an inhaled corticosteroid

9%

Add a combined long-acting beta2-agonist and long-acting muscarinic antagonist inhaler

63%

Refer for consideration of long-term oxygen therapy

4%

Add a long-acting beta2-agonist

14%

Add a combination long-acting beta2-agonist and corticosteroid inhaler

11%

COPD - still breathless despite using SABA/SAMA and **no** asthma/steroid responsive features → add a LABA + LAMA

Important for me Less important

Following the 2018 NICE guidelines, the next step in management would be a combined long-acting beta2-agonist (LABA) and a long-acting muscarinic antagonist (LAMA). This is because there are no 'asthmatic features/features suggesting steroid responsiveness'.

A 49-year-old male with a past history of alcohol excess presents to the Emergency Department due to fever and shortness of breath. Chest x-ray reveals a cavitating lesion in the right middle zone. What is the most likely causative organism?

- ☐ Klebsiella
- ☐ Bartonella
- ☐ Pneumococcus
- ☐ *Coxiella burnetii*
- ☐ *Haemophilus influenzae*

Klebsiella	83%
Bartonella	3%
Pneumococcus	4%
Coxiella burnetii	4%
Haemophilus influenzae	5%

Klebsiella pneumonia (Friedlander's pneumonia) typically occurs in middle-aged alcoholic men. Chest x-ray features may include abscess formation in the middle/upper lobes and empyema. The mortality approaches 30-50%

A 65-year-old man is admitted with fever and dyspnoea. A chest x-ray shows extensive shadowing in the right lower zone. Which one of the following is associated with a poor prognosis in patients with community-acquired pneumonia?

- ☐ Diastolic blood pressure 65 mmHg
- ☐ Sodium 131 mmol/l
- ☐ Urea 12 mmol/l
- ☐ White blood cell $27 \times 10^9/l$
- ☐ Respiratory rate 25/min

Diastolic blood pressure 65 mmHg

9%

Sodium 131 mmol/l

5%

Urea 12 mmol/l

75%

White blood cell 27×10^9 /l

6%

Respiratory rate 25/min

6%

A 31-year-old woman is investigated for lethargy, arthralgia and cough. Over the past few weeks she has also developed painful erythematous nodules on both shins. Respiratory examination is normal. A chest x-ray is performed which is reported as follows:

Bilateral mediastinal nodal enlargement. No evidence of lung parenchymal disease. Normal cardiac size.

Given the likely diagnosis, what is the most appropriate course of action?

- ☐ Inhaled corticosteroids
- ☐ Oral cyclophosphamide
- ☐ Oral corticosteroids
- ☐ Oral methotrexate
- ☐ Observation

Inhaled corticosteroids

3%

Oral cyclophosphamide

3%

Oral corticosteroids

34%

Oral methotrexate

4%

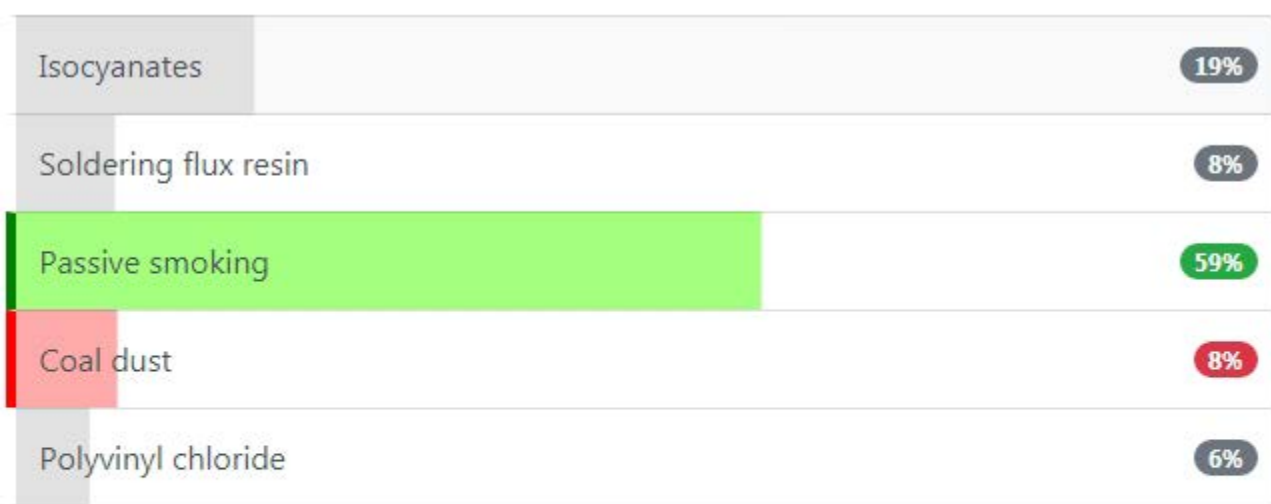
Observation

57%

This patient has sarcoidosis as evidenced by the erythema nodosum and bilateral hilar lymphadenopathy. The chest x-ray is consistent with stage 1 changes. There are no indications here for steroid therapy so observation is the most appropriate action.

A 58-year-old man is investigated for a chronic cough and is found to have lung cancer. He enquires whether it may be work related. Which one of the following is most likely to increase his risk of developing lung cancer?

- ☐ Isocyanates
- ☐ Soldering flux resin
- ☐ Passive smoking
- ☐ Coal dust
- ☐ Polyvinyl chloride



Whilst many chemicals have been implicated in the development of lung cancer passive smoking is the most likely cause. Up to 15% of lung cancers in patients who do not smoke are thought to be caused by passive smoking

A 54-year-old woman with a 30-pack-year history of smoking presents due to increasing breathlessness. A diagnosis of chronic obstructive pulmonary disease (COPD) is suspected. Which of the following diagnostic criteria should be used when assessing a patient with suspected COPD?

- ☐ FEV1 > 70% of predicted value + FEV1/FVC < 60%
- ☐ FEV1/FVC < 70% + symptoms suggestive of COPD
- ☐ FEV1 < 70% of predicted value + FEV1/FVC < 70%
- ☐ FEV1 < 80% of predicted value + FEV1/FVC < 60%
- ☐ FEV1 < 70% of predicted value + FEV1/FVC > 70%

FEV1 > 70% of predicted value + FEV1/FVC < 60%

4%

FEV1/FVC < 70% + symptoms suggestive of COPD

50%

FEV1 < 70% of predicted value + FEV1/FVC < 70%

28%

FEV1 < 80% of predicted value + FEV1/FVC < 60%

10%

FEV1 < 70% of predicted value + FEV1/FVC > 70%

8%

Please see the 2010 NICE guidelines for further details. Patients can now be diagnosed with 'mild' COPD if their FEV1 predicted is > 80% if they have symptoms suggestive of COPD.

Which one of the following would cause a fall in the carbon monoxide transfer factor (TLCO)?

- ☐ Goodpasture's syndrome
- ☐ Left-to-right cardiac shunts
- ☐ Anaemia
- ☐ Hyperkinetic states
- ☐ Exercise

Goodpasture's syndrome

15%

Left-to-right cardiac shunts

14%

Anaemia

62%

Hyperkinetic states

4%

Exercise

6%

Transfer factor

- raised: asthma, haemorrhage, left-to-right shunts, polycythaemia
- low: everything else

Important for me Less important

A 45-year-old dairy farmer presents with increasing shortness-of-breath on exertion. He is a non-smoker and has no respiratory history of note. His symptoms seem to become much worse when he is around the farm and are associated with chest tightness and a non-productive cough. A diagnosis of extrinsic allergic alveolitis is suspected. Which one of the following is most likely to be responsible?

- ☐ *Mycoplasma pneumoniae*
- ☐ Isocyanate based pesticides
- ☐ Contaminated hay
- ☐ Cow faeces
- ☐ Ryegrass (*Lolium sp.*)

Mycoplasma pneumoniae

6%

Isocyanate based pesticides

20%

Contaminated hay

58%

Cow faeces

8%

Ryegrass (

Lolium sp.

)

8%

Contaminated hay is the most common source of *Saccharopolyspora rectivirgula* which is responsible for Farmer's lung.

A 46-year-old female with a history of rheumatoid arthritis is investigated due to progressive shortness of breath. She is currently treated with methotrexate and ibuprofen. The following results are obtained from spirometry:

FEV1/FVC	45%
----------	-----

What is the most likely cause of the dyspnoea?

- ☐ Bronchiolitis obliterans
- ☐ Methotrexate pneumonitis
- ☐ Pulmonary fibrosis
- ☐ Caplan's syndrome
- ☐ Lung cancer

Bronchiolitis obliterans

35%

Methotrexate pneumonitis

26%

Pulmonary fibrosis

25%

Caplan's syndrome

9%

Lung cancer

4%

The spirometry reveals an obstructive picture which would be in keeping with bronchiolitis obliterans

A 24-year-old heroin addict is admitted following an overdose. He is drowsy and has a respiratory rate of 6 / min. Which of the following arterial blood gas results (taken on room air) are most consistent with this?

- ☐ pH = 7.49; pCO₂ = 4.9 kPa; pO₂ = 10.1 kPa
- ☐ pH = 7.52; pCO₂ = 2.9 kPa; pO₂ = 13.1 kPa
- ☐ pH = 7.31; pCO₂ = 7.4 kPa; pO₂ = 8.1 kPa
- ☐ pH = 7.55; pCO₂ = 3.4 kPa; pO₂ = 14.3 kPa
- ☐ pH = 7.32; pCO₂ = 3.4 kPa; pO₂ = 8.3 kPa

pH = 7.49; pCO₂ = 4.9 kPa; pO₂ = 10.1 kPa

5%

pH = 7.52; pCO₂ = 2.9 kPa; pO₂ = 13.1 kPa

6%

pH = 7.31; pCO₂ = 7.4 kPa; pO₂ = 8.1 kPa

77%

pH = 7.55; pCO₂ = 3.4 kPa; pO₂ = 14.3 kPa

5%

pH = 7.32; pCO₂ = 3.4 kPa; pO₂ = 8.3 kPa

8%

This patient is likely to have developed a respiratory acidosis secondary to hypoventilation.

Which one of the following markers is most useful for monitoring the progression of patients with chronic obstructive pulmonary disease?

- ☐ FEV1/FVC ratio
- ☐ Lifestyle questionnaire
- ☐ Oxygen saturations
- ☐ FEV1
- ☐ Number of exacerbations per year

FEV1/FVC ratio

22%

Lifestyle questionnaire

8%

Oxygen saturations

3%

FEV1

48%

Number of exacerbations per year

19%

Dr Assem

Which of the following is not a recognised cause of pulmonary eosinophilia?

- ☐ Churg-Strauss syndrome
- ☐ Sulphonamides
- ☐ Extrinsic allergic alveolitis
- ☐ Löffler's syndrome
- ☐ Allergic bronchopulmonary aspergillosis

Which of the following is not a recognised cause of pulmonary eosinophilia?

Churg-Strauss syndrome

9%

Sulphonamides

31%

Extrinsic allergic alveolitis

36%

Löffler's syndrome

14%

Allergic bronchopulmonary aspergillosis

10%

A 47-year-old man is reviewed in the smoking cessation clinic. Which one of the following conditions would contraindicate the prescription of bupropion?

- ☐ History of supraventricular tachycardia
- ☐ Previous episodes of acute pancreatitis
- ☐ Epilepsy
- ☐ Depression
- ☐ Hypertension

History of supraventricular tachycardia

9%

Previous episodes of acute pancreatitis

5%

Epilepsy

58%

Depression

24%

Hypertension

4%

Bupropion: contraindicated in epilepsy

Important for me Less important

A 52-year-old Afro-Caribbean female with a known past medical history of sarcoidosis attends her GP for increased frequency of urination and polydipsia. Her GP decides to do some blood tests which are as follows:

Hb	132 g/l
Platelets	250 * 10 ⁹ /l
WBC	6.6 * 10 ⁹ /l

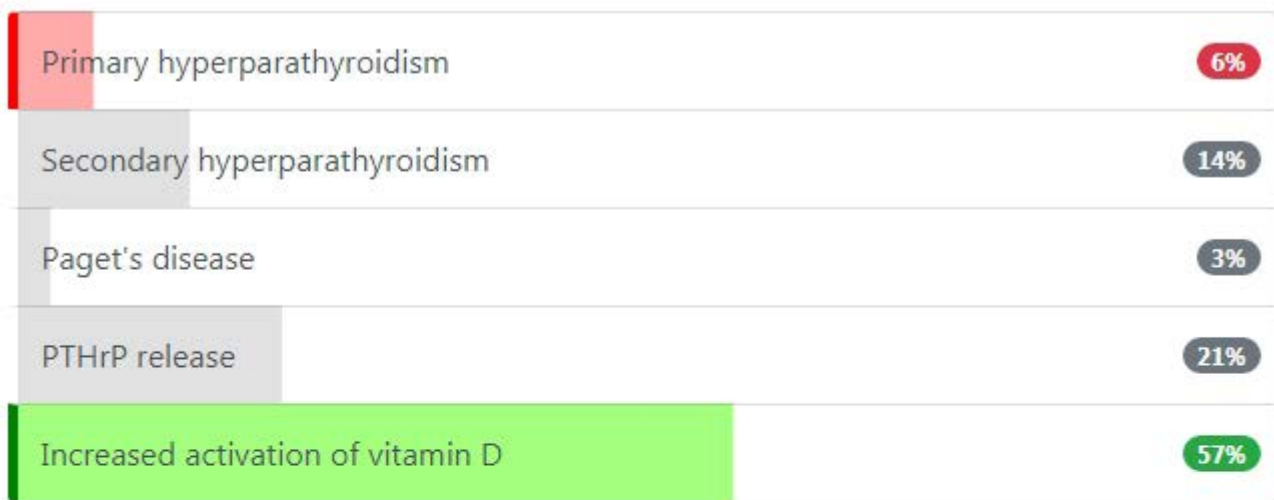
Na ⁺	139 mmol/l
K ⁺	4.4 mmol/l
Urea	4.8 mmol/l
Creatinine	79 µmol/l

Adjusted calcium	2.93mmol/l
------------------	------------

What is the most likely mechanism of hypercalcaemia?

- ☐ Primary hyperparathyroidism
- ☐ Secondary hyperparathyroidism
- ☐ Paget's disease
- ☐ PTHrP release
- ☐ Increased activation of vitamin D

Dr Assem



Sarcoidosis mainly causes hypercalcaemia through forming increased concentrations of calcitriol, the active component of vitamin D. This is as a result of increased activity of 1α hydroxylase produced by the sarcoid macrophages.

Primary hyperparathyroidism is mainly associated with parathyroid adenomas/hyperplasia. As a rule, secondary hyperparathyroidism and Paget's do not cause hypercalcaemia. PTHrP release is associated with malignancies such as squamous cell lung cancers.

A 25-year-old man is referred due to pain and swelling in his knees and ankles. On examination he has a painful, erythematous rash on his legs. The following results are obtained:

Rheumatoid factor	Negative
ESR	94 mm/hr
Chest x-ray	Hilar lymphadenopathy

What is the most likely outcome?

- ☐ Improvement following a course of prednisolone
- ☐ Scarring and ulceration of skin
- ☐ Spontaneous improvement
- ☐ Progressive arthritis
- ☐ Renal replacement therapy in 20 years time

Improvement following a course of prednisolone

25%

Scarring and ulceration of skin

9%

Spontaneous improvement

48%

Progressive arthritis

8%

Renal replacement therapy in 20 years time

10%

The majority of patients with sarcoidosis get better without treatment

Important for me Less important

This man has an acute form of sarcoidosis. There are no indications for steroid therapy and his symptoms will resolve spontaneously in the majority of cases

You are reviewing a 40-year-old man who is known to have bronchiectasis. What organism is most likely to be isolated from his sputum?

☐ *Streptococcus pneumoniae*

☐ *Klebsiella* spp.

☐ *Haemophilus influenzae*

☐ *Pneumocystis jiroveci*

☐ *Pseudomonas aeruginosa*

Streptococcus pneumoniae

12%

Klebsiella

spp.

8%

Haemophilus influenzae

48%

Pneumocystis jiroveci

3%

Pseudomonas aeruginosa

29%

Bronchiectasis: most common organism = *Haemophilus influenzae*

Important for me

Less important

A 70-year-old retired plumber is reviewed on the respiratory ward after being admitted from clinic for a pleural tap. He was initially referred by his GP after a chest x-ray showed a unilateral pleural effusion. Past medical history includes depression and lumbar spinal stenosis. Of particular relevance he has never smoked. On admission he was afebrile and well, other than feeling a little short of breath.

30 mls of pleural fluid is tapped from the right pleural space:

Appearance	cloudy
Protein	52g/l
pH	7.35
MC&S	negative
Cytology	negative

A pleural CT is requested but only shows minor thickening on a small area of the right pleura.

What is the most appropriate next investigation?

- ☐ Repeat pleural tap and send for fluid for further analysis
- ☐ CT-guided pleural biopsy
- ☐ CT pulmonary angiography
- ☐ Local anaesthetic thoracoscopy
- ☐ Bronchoscopy

Repeat pleural tap and send for fluid for further analysis

8%

CT-guided pleural biopsy

48%

CT pulmonary angiography

4%

Local anaesthetic thoracoscopy

26%

Bronchoscopy

14%

This patient has presented with a unilateral, exudative, cytology negative pleural effusion. The results/history are not consistent with an infective cause. Malignancy therefore needs to be excluded, particularly given his occupational history. The next step is therefore to get a tissue diagnosis. Local anaesthetic thoracoscopy has a high yield and is now the investigation of choice in patients with cytology negative exudative effusions.

Which one of the following is responsible for farmer's lung?

☐ *Aspergillus clavatus*

☐ *Saccharopolyspora rectivirgula*

☐ *Candida albicans*

☐ *Mycobacterium avium*

☐ Avian proteins

Aspergillus clavatus

20%

Saccharopolyspora rectivirgula

63%

Candida albicans

3%

Mycobacterium avium

7%

Avian proteins

8%

Saccharopolyspora rectivirgula causes farmer's lung, a type of EAA

Important for me

Less important

A 48-year-old salesman presents with a 5 day history of cough and pleuritic chest pain. He has no past medical history of note. On examination his temperature is 38.2°C, blood pressure is 120/80 mmHg, respiratory rate 18/min and pulse 84/min. Auscultation of the chest reveals bronchial breathing in the left base and the same area is dull to percussion. What is the most suitable management?

- ☐ Oral amoxicillin + discharge
- ☐ Oral co-amoxiclav + discharge
- ☐ Oral amoxicillin + erythromycin + discharge
- ☐ Oral erythromycin + discharge
- ☐ Admit

Oral amoxicillin + discharge

61%

Oral co-amoxiclav + discharge

13%

Oral amoxicillin + erythromycin + discharge

11%

Oral erythromycin + discharge

4%

Admit

11%

A 74-year-old man with Chronic Obstructive Pulmonary Disease (COPD) presents on the acute take with increasing shortness of breath over the past two days. His arterial blood gas on room air shows:

pH	7.28
pO2	5.9kPa
pCO2	7.9kPa
HCO3-	31.0mmol/L
BE	+3.5mmol/L

He is started on 2 litres of oxygen and the second gas shows:

pH	7.25
pO2	6.1kPa
pCO2	8.5kPa
HCO3-	31.2mmol/L
BE	+3.5mmol/L

What is the next most appropriate course of action?

- ☐ Intubate and ventilate the patient
- ☐ Start 28% Venturi mask
- ☐ Start non-invasive ventilation
- ☐ Place the patient on room air
- ☐ Continue 2 litres of oxygen

Intubate and ventilate the patient

16%

Start 28% Venturi mask

9%

Start non-invasive ventilation

65%

Place the patient on room air

5%

Continue 2 litres of oxygen

5%

If you recognise that the first blood gas result shows that the patient is very unwell, you know that placing the patient back on room air is not enough.

Their blood gas has worsened with just 2 litres of oxygen and so continuing this or increasing the oxygen to 28% will worsen the patient's condition.

It may be that the patient eventually requires intubation and ventilation to manage their condition but for most patients with acute exacerbations of COPD, a period of non-invasive ventilation with BiPAP (bi-level pressure support) is attempted first.

A 45-year-old man is prescribed bupropion to help him quit smoking. What is the mechanism of action of bupropion?

- ☐ Nicotinic receptor partial agonist
- ☐ Selective serotonin reuptake inhibitor
- ☐ Norepinephrine and dopamine reuptake inhibitor, and nicotinic antagonist
- ☐ Dopamine agonist
- ☐ Dopamine antagonist

Nicotinic receptor partial agonist

22%

Selective serotonin reuptake inhibitor

5%

Norepinephrine and dopamine reuptake inhibitor, and nicotinic antagonist

61%

Dopamine agonist

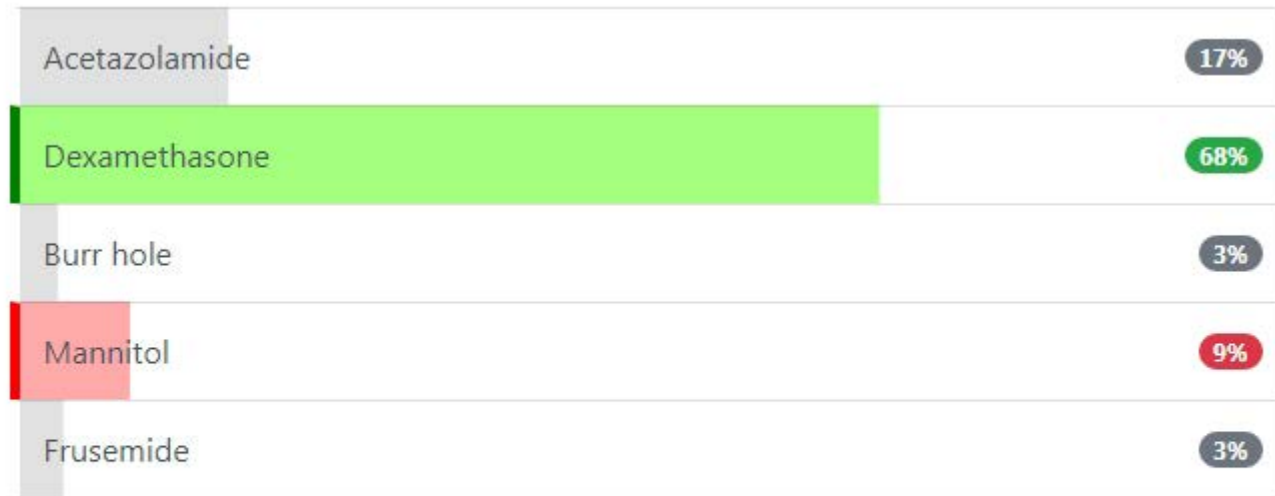
6%

Dopamine antagonist

5%

A 28-year-old man develops nausea and a severe headache whilst trekking in Nepal. Within the next hour he becomes ataxic and confused. A diagnosis of high altitude cerebral oedema is suspected. Other than descent and oxygen, what is the most important treatment?

- ☐ Acetazolamide
- ☐ Dexamethasone
- ☐ Burr hole
- ☐ Mannitol
- ☐ Frusemide



Acetazolamide is used more in the prevention of altitude related disorders, rather than the treatment.

A 54-year-old woman with chronic obstructive pulmonary disease (COPD) is prescribed an inhaled corticosteroid. What is the main therapeutic benefit of inhaled corticosteroids in patients with COPD?

- ☐ Reduced severity of exacerbations
- ☐ Improved all cause mortality
- ☐ Reduced use of bronchodilators
- ☐ Slows decline in FEV1
- ☐ Reduced frequency of exacerbations

Reduced severity of exacerbations

21%

Improved all cause mortality

7%

Reduced use of bronchodilators

8%

Slows decline in FEV1

8%

Reduced frequency of exacerbations

56%

COPD - reason for using inhaled corticosteroids - reduced exacerbations

Important for me Less important

A 58-year-old man is reviewed on the surgical wards 7 days after having an anterior resection for a rectal carcinoma. He developed a cough 2 days ago and had a chest x-ray which showed consolidation of the right lower lobe. A diagnosis of post-op pneumonia was made and he was started on broad spectrum intravenous antibiotics.

Over the past 24 hours he has become progressively more short-of-breath. On examination his respiratory rate is 30/min, heart rate 102/min, temperature of 37.2°C and oxygen saturations of 92% on an oxygen concentration of 35%. Bibasal crackles are noted on lung auscultation. An ECG show sinus rhythm and no acute changes. A chest x-ray shows bilateral infiltrates in both bases.

What is the most likely diagnosis?

- ☐ Bilateral lobar pneumonia
- ☐ Heart failure secondary to a myocardial infarction
- ☐ Acute respiratory distress syndrome
- ☐ Atelectasis
- ☐ Massive pulmonary embolism

Bilateral lobar pneumonia	8%
Heart failure secondary to a myocardial infarction	4%
Acute respiratory distress syndrome	58%
Atelectasis	15%
Massive pulmonary embolism	15%

This patient has a number of features in keeping with a diagnosis of acute respiratory distress syndrome:

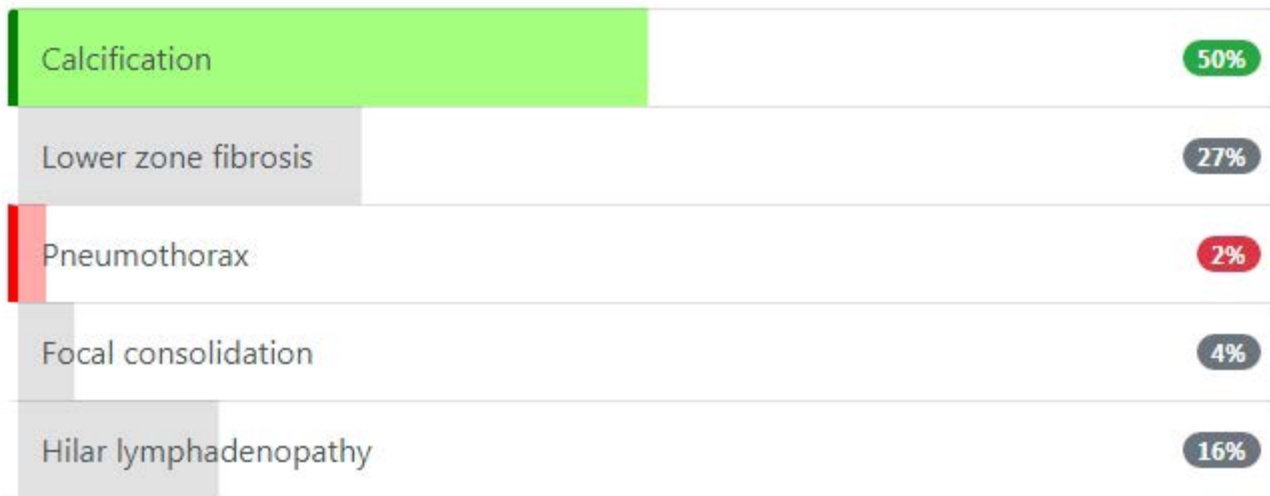
- acute onset within the past day, on the background of a known risk factor (pneumonia)
- bilateral pulmonary oedema (crackles, x-ray changes)
- hypoxia despite oxygen therapy

The absence of chest pain and a normal ECG go against a diagnosis of myocardial infarction.

An 81-year-old gentleman is admitted with progressive worsening shortness of breath and a persistent dry cough. His respiratory rate is 30/min, heart rate 82/min, and temperature 37.3°C. The patient is an ex-miner and a diagnosis of silicosis is suspected.

What is the most relevant finding, consistent with this diagnosis, from the list below that would be seen on lung imaging?

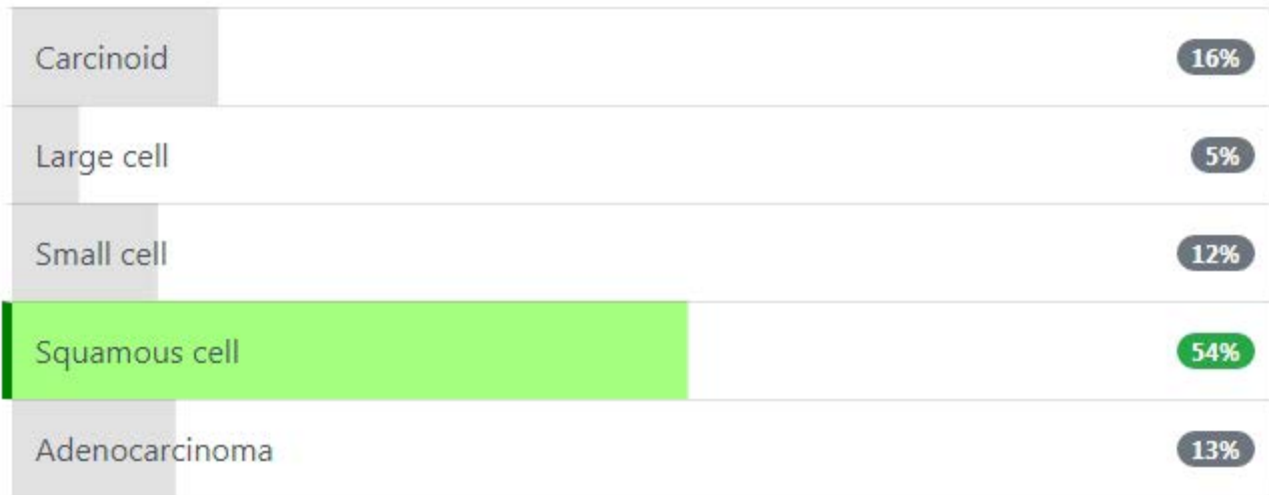
- ☐ Calcification
- ☐ Lower zone fibrosis
- ☐ Pneumothorax
- ☐ Focal consolidation
- ☐ Hilar lymphadenopathy



The typical chest X-ray findings in chronic silicosis are multiple and small well-rounded nodules, particularly in the upper zone. As the disease progresses the hilar retracts upwards and cavitation can occur leading to the potential for a secondary tuberculosis infection. Classically, eggshell calcification is seen on imaging.

Which one of the following types of lung cancer is most associated with cavitating lesions?

- ☐ Carcinoid
- ☐ Large cell
- ☐ Small cell
- ☐ Squamous cell
- ☐ Adenocarcinoma



Whilst the other types of lung cancer may cause cavitating lesions, it is most commonly seen in squamous cell cancer

Which one of the following statements regarding raloxifene in the management of osteoporosis is **incorrect**?

- ☐ Has been shown to prevent bone loss and to reduce the risk of vertebral fractures
- ☐ Is a selective oestrogen receptor modulator
- ☐ May worsen menopausal symptoms
- ☐ Increases risk of thromboembolic events
- ☐ Increases the risk of breast cancer

Has been shown to prevent bone loss and to reduce the risk of vertebral fractures

11%

Is a selective oestrogen receptor modulator

12%

May worsen menopausal symptoms

22%

Increases risk of thromboembolic events

14%

Increases the risk of breast cancer

41%

Raloxifene may actually decrease the risk of breast cancer

Dr Assem

A 55-year-old man presents with pain and stiffness in his hands. This has been getting gradually worse over the past few months and is associated with stiffness in the mornings.

On examination, you note bilateral swelling of the metacarpal phalangeal (MCP) and distal interphalangeal (DIP). One of the digits is swollen along the whole length.

What is the most likely diagnosis?

- ☐ Osteoarthritis
- ☐ Rheumatoid arthritis
- ☐ Psoriatic arthritis
- ☐ Gout
- ☐ Reactive arthritis

Osteoarthritis

14%

Rheumatoid arthritis

36%

Psoriatic arthritis

40%

Gout

5%

Reactive arthritis

4%

Inflammatory arthritis involving DIP swelling and dactylitis points to a diagnosis of psoriatic arthritis

Important for me Less important

The morning stiffness points to an inflammatory arthritis such as rheumatoid or psoriatic. However, DIP and dactylitis are much more common in psoriatic arthritis, making this the most likely diagnosis.

A 54-year-old man presents to the Emergency Department with a 2 day history of an swollen, painful left knee. Aspirated joint fluid shows calcium pyrophosphate crystals. Which of the following blood tests is most useful in revealing an underlying cause?

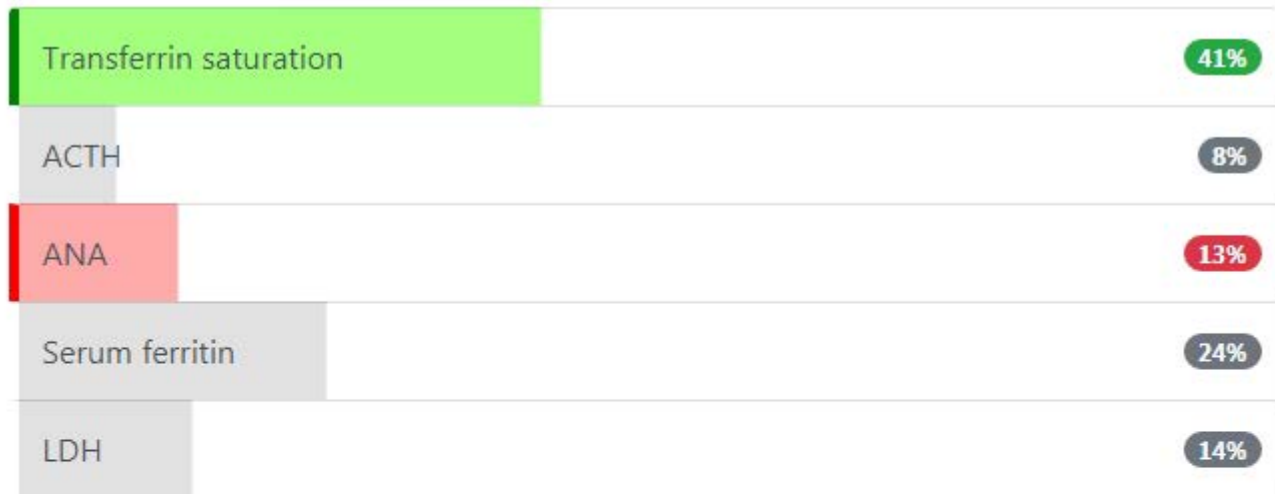
☐ Transferrin saturation

☐ ACTH

☐ ANA

☐ Serum ferritin

☐ LDH



This is a typical presentation of pseudogout. An elevated transferrin saturation may indicate haemochromatosis, a recognised cause of pseudogout

A high ferritin level is also seen in haemochromatosis but can be raised in a variety of infective and inflammatory processes, including pseudogout, as part of an acute phase response

A 28-year-old woman with rheumatoid arthritis asks for advice about conception. Which one of the following statements is true?

- ☐ Methotrexate may be continued during pregnancy as long as the woman takes folic acid 5mg daily
- ☐ NSAIDs should be avoided in the first and second trimester
- ☐ Woman with rheumatoid should be encouraged to conceive as soon as possible (ideally within 1 year) after diagnosis to minimise the risk of complications
- ☐ TNF- α blockers are absolutely contraindicated in pregnancy
- ☐ Hydroxychloroquine is considered safe during pregnancy

Methotrexate may be continued during pregnancy as long as the woman takes folic acid 5mg daily

7%

NSAIDs should be avoided in the first and second trimester

14%

Woman with rheumatoid should be encouraged to conceive as soon as possible (ideally within 1 year) after diagnosis to minimise the risk of complications

9%

TNF- α blockers are absolutely contraindicated in pregnancy

14%

Hydroxychloroquine is considered safe during pregnancy

56%

A 57-year-old man presents with pain in his right knee. An x-ray shows osteoarthritis. He has no past medical history of note. What is the most suitable treatment option for the management of his pain?

- ☐ Oral diclofenac with omeprazole
- ☐ Oral glucosamine
- ☐ Oral diclofenac
- ☐ Oral ibuprofen
- ☐ Oral paracetamol

Oral diclofenac with omeprazole

25%

Oral glucosamine

6%

Oral diclofenac

7%

Oral ibuprofen

12%

Oral paracetamol

50%

Osteoarthritis - paracetamol + topical NSAIDs (if knee/hand) first-line

Important for me Less important

Oral NSAIDs should be used second line in osteoarthritis due to their adverse effect profile

A 64-year-old man with chronic kidney disease stage 3 secondary to type 2 diabetes mellitus presents with pain and swelling at the right first metatarsophalangeal joint. On examination the joint is hot, erythematous and tender to touch, although he can still flex the big toe. What is the most appropriate initial management?

- ☐ Colchicine
- ☐ Prednisolone
- ☐ Co-codamol 30/500
- ☐ Allopurinol
- ☐ Indomethacin

Colchicine	63%
Prednisolone	11%
Co-codamol 30/500	8%
Allopurinol	6%
Indomethacin	12%

Colchicine is useful in patients with renal impairment who develop gout as NSAIDs are relatively contraindicated. The BNF advises to reduce the dose by up to 50% if creatinine clearance is less than 50 ml/min and to avoid if creatinine clearance is less than 10 ml/min.

Co-codamol 30/500 may be used as an adjunct but would not provide relief as monotherapy.

Prednisolone is an option but would adversely affect his diabetic control.

A 40-year-old woman complains of a permanent 'funny-bone' sensation in her right elbow. This is accompanied by tingling in the little and ring finger. Her symptoms are worse when the elbow is bent for prolonged periods. What is the most likely diagnosis?

- ☐ Cubital tunnel syndrome
- ☐ Lateral epicondylitis
- ☐ Medial epicondylitis
- ☐ Median nerve entrapment syndrome
- ☐ Radial tunnel syndrome

Cubital tunnel syndrome

53%

Lateral epicondylitis

9%

Medial epicondylitis

20%

Median nerve entrapment syndrome

10%

Radial tunnel syndrome

8%

A 74-year-old man presents with a severe throbbing headache on the right side of his head. He has now had this pain for around 6-7 days but reports no obvious trigger. There have been no visual disturbances or episodes of limb weakness. Neurological examination is unremarkable. The right side of his head is tender to touch but he cannot remember falling. Given the likely diagnosis what is the most important initial step?

- ☐ Give high-dose oral prednisolone
- ☐ Arrange an urgent orbital x-ray for suspected blow-out fracture
- ☐ Arrange an urgent temporal artery biopsy
- ☐ Arrange an urgent CT head
- ☐ Ocular pilocarpine + intravenous acetazolamide

Give high-dose oral prednisolone

71%

Arrange an urgent orbital x-ray for suspected blow-out fracture

4%

Arrange an urgent temporal artery biopsy

15%

Arrange an urgent CT head

6%

Ocular pilocarpine + intravenous acetazolamide

4%

This patient has temporal arteritis and requires high-dose oral steroids to prevent ocular complications

Dr Assem

A 43-year-old woman who has rheumatoid arthritis is reviewed in clinic. She has responded poorly to methotrexate and consideration is being given to starting sulfasalazine. An existing allergy to which one of the following drugs may be a contradiction to the prescription?

- ☐ Penicillin
- ☐ Trimethoprim
- ☐ Aspirin
- ☐ Sulpiride
- ☐ Leflunomide

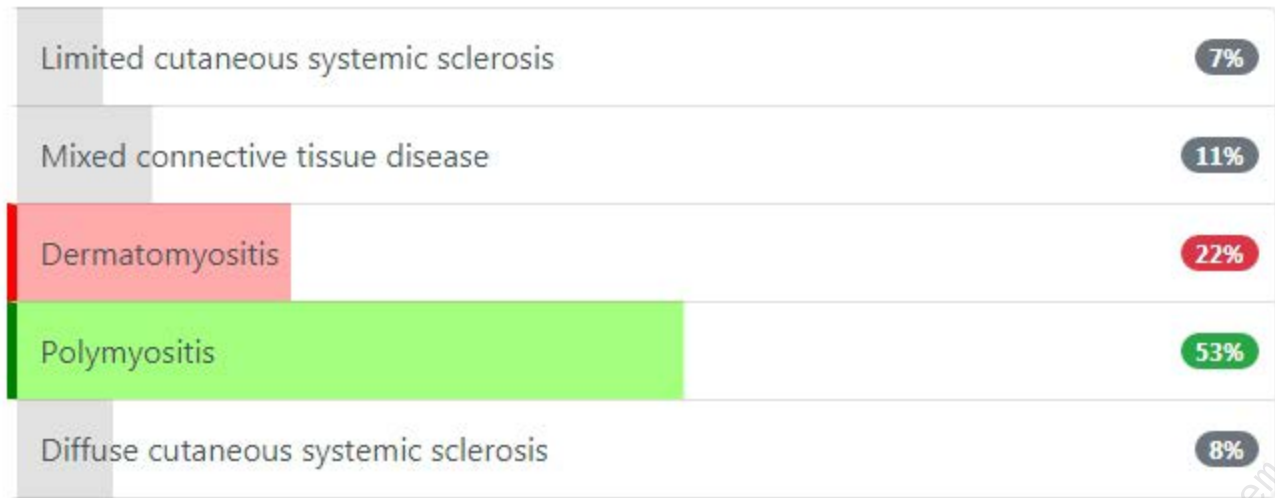


Patients who are allergic to aspirin may also react to sulfasalazine

Important for me Less important

An autoantibody screen reveals that a patient is positive for anti-Jo 1 antibodies. What is the most likely underlying diagnosis?

- ☐ Limited cutaneous systemic sclerosis
- ☐ Mixed connective tissue disease
- ☐ Dermatomyositis
- ☐ Polymyositis
- ☐ Diffuse cutaneous systemic sclerosis



Anti-Jo 1 antibodies are more commonly seen in polymyositis than dermatomyositis

Which of the following statements is true regarding psoriatic arthropathy?

- ☐ Skin disease always precedes joint disease
- ☐ Approximately one-third of patients with psoriasis eventually develop arthropathy
- ☐ The mainstay of management is analgesia, physiotherapy and joint replacement
- ☐ Males and females are equally affected
- ☐ Arthritis mutilans is the most common subtype

Skin disease always precedes joint disease

10%

Approximately one-third of patients with psoriasis eventually develop arthropathy

30%

The mainstay of management is analgesia, physiotherapy and joint replacement

11%

Males and females are equally affected

41%

Arthritis mutilans is the most common subtype

9%

Males and females are affected equally by psoriatic arthritis

Dr Assem

Which one of the following features is least commonly seen in drug-induced lupus?

☐ Glomerulonephritis

☐ Arthralgia

☐ Myalgia

☐ Malar rash

☐ Pleurisy

Glomerulonephritis

48%

Arthralgia

8%

Myalgia

8%

Malar rash

18%

Pleurisy

19%

Glomerulonephritis is unusual in drug-induced lupus

Dr. Assem

Which one of the following is most recognised as a risk factor for developing osteoporosis?

- ☐ Osteogenesis imperfecta
- ☐ Marfan's syndrome
- ☐ Myotonic dystrophy
- ☐ Duchenne muscular dystrophy
- ☐ Ehler-Danlos syndrome

Osteogenesis imperfecta

56%

Marfan's syndrome

14%

Myotonic dystrophy

10%

Duchenne muscular dystrophy

7%

Ehler-Danlos syndrome

13%

A 54-year-old woman who has had two Colle's fractures in the past three years has a DEXA scan:

	T-score
L2-4	-1.4
Femoral neck	-2.7

What does the scan show?

- ☐ Osteoporosis in both the vertebrae and femoral neck
- ☐ Osteoporosis in vertebrae, osteopaenia in femoral neck
- ☐ Osteopaenia in both the vertebrae and femoral neck
- ☐ Osteopaenia in vertebrae, osteoporosis in femoral neck
- ☐ Normal bone density in vertebrae, osteoporosis in femoral neck

Osteoporosis in both the vertebrae and femoral neck

5%

Osteoporosis in vertebrae, osteopaenia in femoral neck

8%

Osteopaenia in both the vertebrae and femoral neck

4%

Osteopaenia in vertebrae, osteoporosis in femoral neck

63%

Normal bone density in vertebrae, osteoporosis in femoral neck

20%

A 65-year-old man presents with bilateral leg pain that is brought on by walking. His past medical history includes peptic ulcer disease and osteoarthritis. He can typically walk for around 5 minutes before it develops. The pain subsides when he sits down. He has also noticed that leaning forwards or crouching improves the pain. Musculoskeletal and vascular examination of his lower limbs is unremarkable. What is the most likely diagnosis?

- ☐ Inflammatory arachnoiditis
- ☐ Peripheral arterial disease
- ☐ Raised intracranial pressure
- ☐ Spinal stenosis
- ☐ Lumbar vertebral crush fracture

Inflammatory arachnoiditis

9%

Peripheral arterial disease

11%

Raised intracranial pressure

4%

Spinal stenosis

71%

Lumbar vertebral crush fracture

5%

This is a classic presentation of spinal stenosis. Whilst peripheral arterial disease is an obvious differential the characteristic relieving factors of the pain and normal vascular examination point away from this diagnosis.

Dr Assem

A 30-year-old intravenous drug user is diagnosed as having osteomyelitis of the right tibia. What is the most likely causative organism?

- ☐ *Salmonella* species
- ☐ *Haemophilus influenzae*
- ☐ *Staphylococcus aureus*
- ☐ *Enterobacter* species
- ☐ *Streptococcus pyogenes*

Salmonella

species

6%

Haemophilus influenzae

4%

Staphylococcus aureus

80%

Enterobacter

species

4%

Streptococcus pyogenes

6%

A 62-year-old man with lung cancer is suspected of having dermatomyositis. Which one of the following antibodies is most likely to be positive?

☐ Anti-nuclear antibodies

☐ Anti-centromere bodies

☐ Anti-scl-70 antibodies

☐ Anti-Jo-1 antibodies

☐ Anti-Mi-2 antibodies



Dermatomyositis antibodies: ANA most common, anti-Mi-2 most specific

Important for me Less important

A 50-year-old man with no past medical history is investigated for ongoing back pain. He is found to have a vertebral collapse secondary to osteoporosis. What is the most appropriate test to determine the cause of his osteoporosis?

- ☐ Thyroid function tests
- ☐ Prostate specific antigen
- ☐ Oestrogen level
- ☐ Prolactin level
- ☐ Testosterone level

Thyroid function tests

19%

Prostate specific antigen

26%

Oestrogen level

8%

Prolactin level

5%

Testosterone level

41%

Osteoporosis in a man - check testosterone

Important for me Less important

Whilst thyrotoxicosis is a known cause of osteoporosis, testosterone deficiency is much more likely in a middle-aged male

Osteogenesis imperfecta is due to a defect in which one of the following proteins?

- ☐ Fibrillin
- ☐ Elastin
- ☐ Type I collagen
- ☐ Type IV collagen
- ☐ Polycystin-1

Fibrillin

8%

Elastin

8%

Type I collagen

50%

Type IV collagen

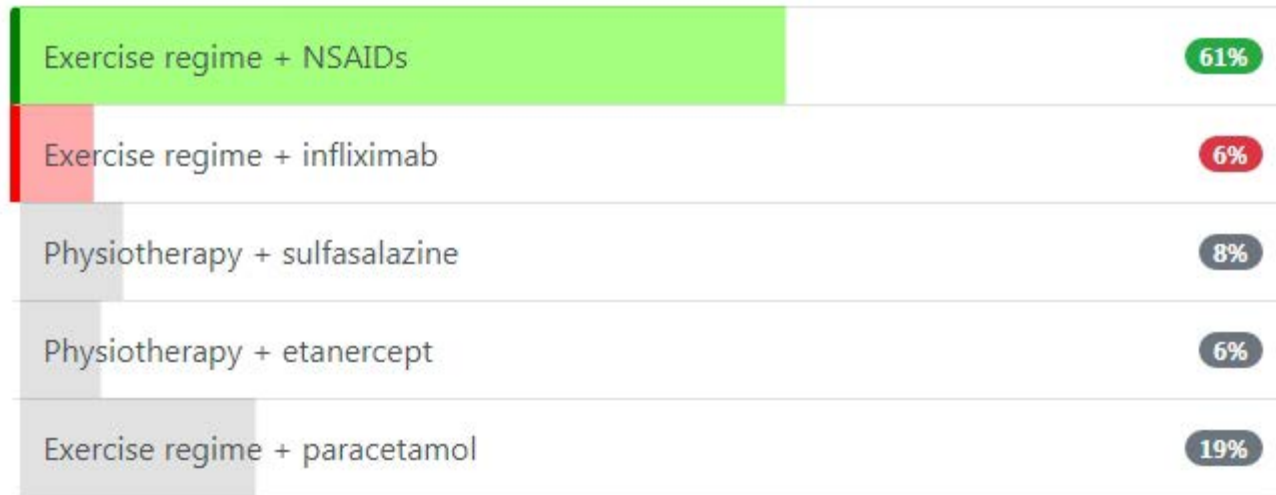
27%

Polycystin-1

7%

A 28-year-old man is diagnosed with having ankylosing spondylitis. He presented with a six month history of back pain. On examination there is reduced lateral flexion of the spine but no evidence of any other complications. Which one of the following is he most likely to offered as first-line treatment?

- ☐ Exercise regime + NSAIDs
- ☐ Exercise regime + infliximab
- ☐ Physiotherapy + sulfasalazine
- ☐ Physiotherapy + etanercept
- ☐ Exercise regime + paracetamol



The anti-TNF drugs are currently only used for patients with severe ankylosing spondylitis which has failed to respond to NSAIDs.

Which one of the following features is least commonly seen in patients with pseudoxanthoma elasticum?

- ☐ Increased risk of ischaemic heart disease
- ☐ Retinitis pigmentosa
- ☐ Gastrointestinal haemorrhage
- ☐ Autosomal recessive inheritance
- ☐ 'Plucked chicken skin' appearance

Increased risk of ischaemic heart disease

13%

Retinitis pigmentosa

33%

Gastrointestinal haemorrhage

18%

Autosomal recessive inheritance

22%

'Plucked chicken skin' appearance

14%

A 57-year-old female has noticed that the skin on her hands has become very tight and that her fingers sometimes turn blue. She has also had difficulty swallowing both solids and liquids. What autoantibody is most associated with these symptoms?

- ☐ Anti-centromere
- ☐ Anti-topoisomerase (anti-Scl-70)
- ☐ Anti-double-stranded DNA (anti-dsDNA)
- ☐ Anti-cyclic citrullinated peptide (anti-CCP)
- ☐ Anti-mitochondrial (AMA)

Anti-centromere	59%
Anti-topoisomerase (anti-Scl-70)	27%
Anti-double-stranded DNA (anti-dsDNA)	6%
Anti-cyclic citrullinated peptide (anti-CCP)	4%
Anti-mitochondrial (AMA)	4%

This female has limited cutaneous systemic sclerosis. This is indicated as the scleroderma is limited to the distal extremities only, however, the face may also be involved also. Limited systemic sclerosis is associated with anti-centromere antibodies.

Anti-Scl-70 antibodies are associated with diffuse systemic sclerosis. In diffuse systemic sclerosis, scleroderma involves the trunk and proximal limbs.

Anti-dsDNA antibodies are associated with systemic lupus erythematosus (SLE). SLE generally presents with non-specific symptoms such as, fatigue, fever, oral ulcers, joint pain and a rash.

Anti-CCP antibodies are associated with rheumatoid arthritis. Rheumatoid arthritis typically presents with joint pain.

AMA is associated with primary biliary cirrhosis (PBC). PBC is often asymptomatic in the early stages but may present as fatigue, pruritus and jaundice.

Which one of the following is most useful in the management of Familial Mediterranean Fever?

- ☐ Prednisolone
- ☐ Erythromycin
- ☐ Cyclophosphamide
- ☐ Colchicine
- ☐ Benzylpenicillin

Prednisolone

17%

Erythromycin

13%

Cyclophosphamide

13%

Colchicine

47%

Benzylopenicillin

9%

Which one of the following drugs has been associated with an increased risk of atypical stress fractures of the proximal femoral shaft?

☐ Spironolactone

☐ Alendronate

☐ Quetiapine

☐ Venlafaxine

☐ Clopidogrel

Spironolactone

13%

Alendronate

52%

Quetiapine

15%

Venlafaxine

13%

Clopidogrel

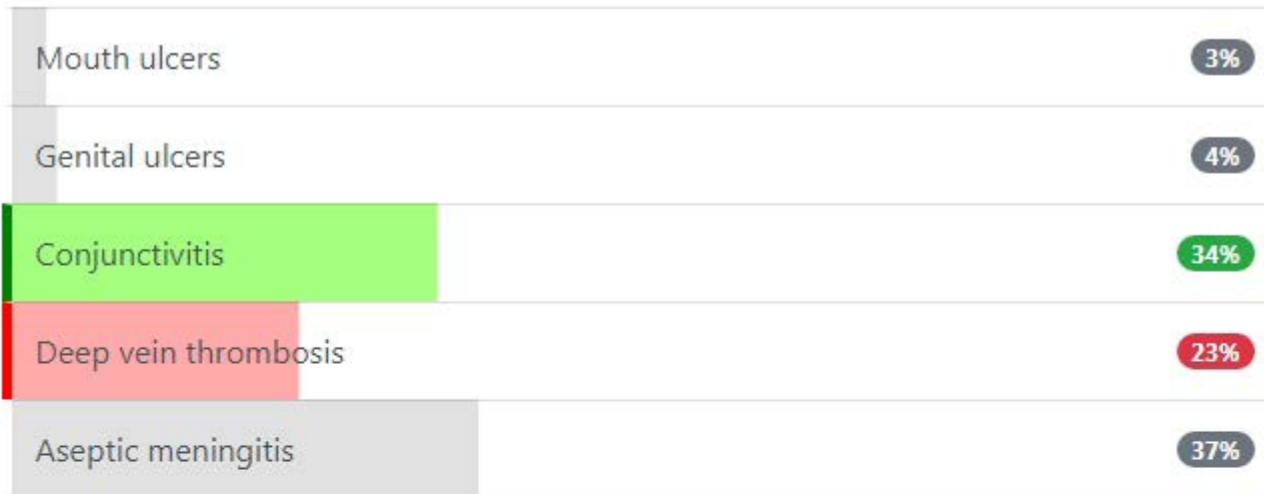
7%

Bisphosphonates are associated with an increased risk of atypical stress fractures

Important for me Less important

Which one of the following is least associated with Behcet's syndrome?

- ☐ Mouth ulcers
- ☐ Genital ulcers
- ☐ Conjunctivitis
- ☐ Deep vein thrombosis
- ☐ Aseptic meningitis



Oral ulcers + genital ulcers + anterior uveitis = Behcet's

Important for me Less important

Mouth ulcers, genital ulcers, deep vein thrombosis and aseptic meningitis are all recognised features of Behcet's syndrome

Ocular involvement is the most feared complication of Behcet's syndrome. Conjunctivitis is seen rarely and is much less common than anterior uveitis. Other ocular problems seen include retinal vasculitis, iridocyclitis and chorioretinitis

Each one of the following is seen in reactive arthritis, except:

- ☐ Urethritis
- ☐ Keratoderma blenorrhagica
- ☐ Conjunctivitis
- ☐ Aseptic meningoencephalitis
- ☐ Circinate balanitis

Urethritis

4%

Keratoderma blenorrhagica

15%

Conjunctivitis

14%

Aseptic meningoencephalitis

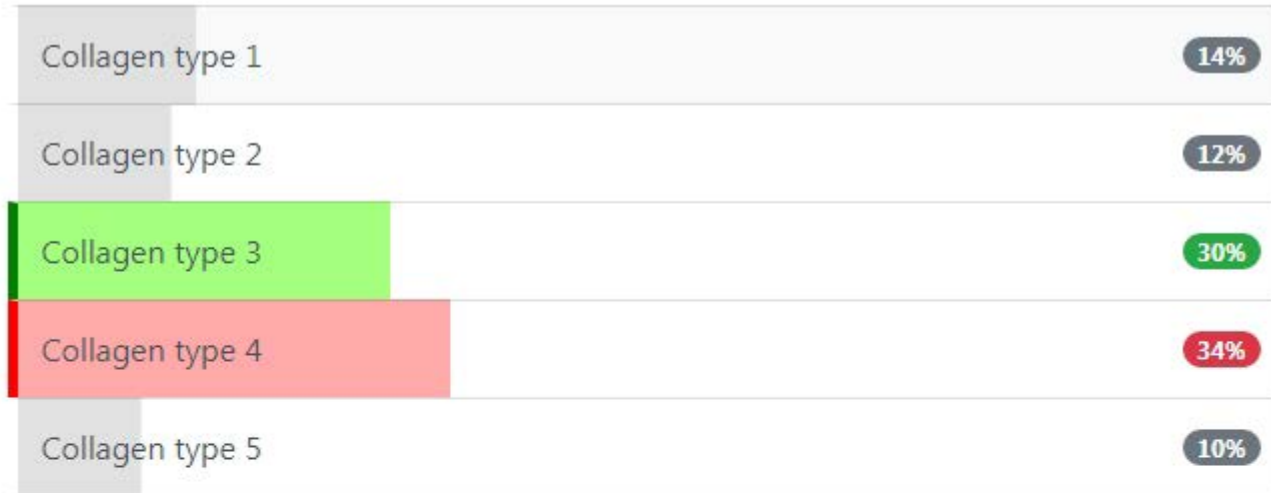
52%

Circinate balanitis

14%

A 24-year-old male comes into the GP with due to constant bruising. On examination, he has an early-diastolic murmur over the aortic region. His skin is very elastic and his joints extend further than they normally should. He is referred for genetic tests, which confirm the suspected diagnosis of Ehlers-Danlos syndrome. Which type of collagen is primarily affected by Ehlers-Danlos syndrome?

- ☐ Collagen type 1
- ☐ Collagen type 2
- ☐ Collagen type 3
- ☐ Collagen type 4
- ☐ Collagen type 5



Ehlers-Danlos syndrome is most commonly associated with a defect in type III collagen

Important for me Less important

Ehlers-Danlos syndrome is primarily caused by a genetic defect in collagen type III. Collagen Type V is affected in a less common variant of Ehlers-Danlos syndrome.

Collagen type I is defective in osteogenesis imperfecta. Collagen IV is defective in Goodpasture's syndrome.

A 57-year-old woman presents with a three month history of right-sided hip pain. This seems to have come on spontaneously without any obvious precipitating event. The pain is described as being worse on the 'outside' of the hip and is particularly bad at night when she lies on the right hand side.

On examination there is a full range of movement in the hip including internal and external rotation. Deep palpation of the lateral aspect of the right hip joint recreates the pain.

An x-ray of the right hip is reported as follows:

Right hip: Minor narrowing of the joint space otherwise normal appearance

What is the most likely diagnosis?

- ☐ Fibromyalgia
- ☐ Lumbar nerve root compression
- ☐ Osteoarthritis
- ☐ Greater trochanteric pain syndrome
- ☐ Meralgia paraesthetica

Fibromyalgia	5%
Lumbar nerve root compression	5%
Osteoarthritis	23%
Greater trochanteric pain syndrome	52%
Meralgia paraesthetica	14%

Greater trochanteric pain syndrome is now the preferred term for trochanteric bursitis.

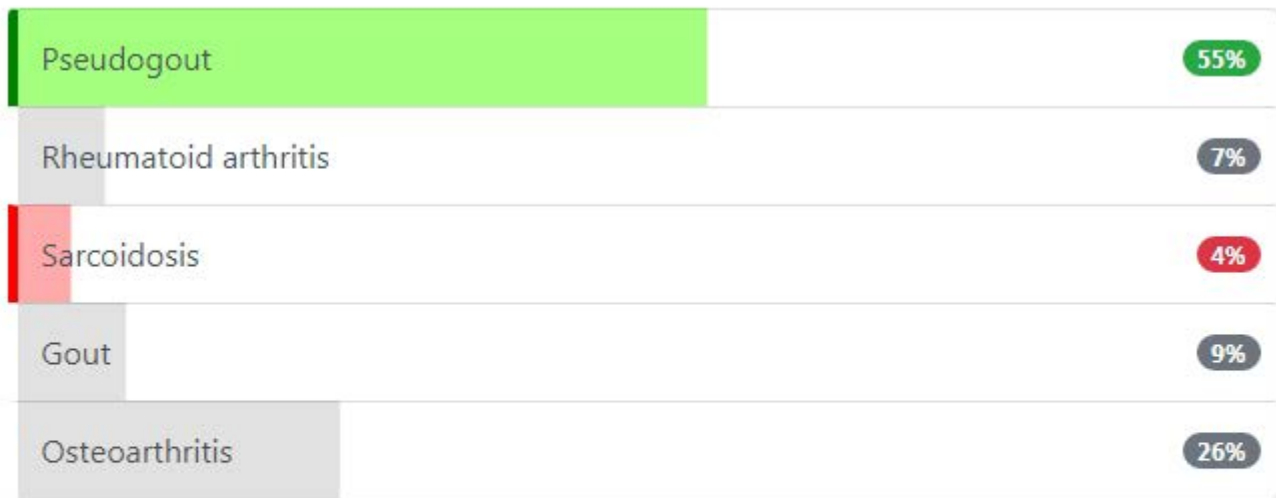
Whilst the x-ray shows joint space narrowing this is not an uncommon finding. Osteoarthritis would also be less likely given the palpable nature of the pain and relatively short duration of symptoms.

A 68-year-old presents with a painful swollen left knee which has failed to settle after a weeks rest. There is no history of trauma. On examination he has a moderate sized effusion. A plain radiograph is reported as follows:

Some loss of joint space
Linear calcification of the articular cartilage

What is the most likely diagnosis?

- ☐ Pseudogout
- ☐ Rheumatoid arthritis
- ☐ Sarcoidosis
- ☐ Gout
- ☐ Osteoarthritis



This x-ray describes chondrocalcinosis. Non-specific changes such as loss of joint space are common in this age group and pseudogout itself may cause osteoarthritic-like changes.

A 76-year-old female presents with a 1 month history of left sided temporal headaches and jaw claudication. Biopsy of left temporal artery is negative.

Hb	130 g/l
Platelets	$359 \times 10^9/l$
WBC	$10 \times 10^9/l$
CRP	89 mg/l

What is the next best step in management?

- ☐ Observation
- ☐ Commence prednisolone
- ☐ Biopsy the right temporal artery
- ☐ CT brain
- ☐ Ultrasound of left temporal artery

Observation	4%
Commence prednisolone	76%
Biopsy the right temporal artery	7%
CT brain	7%
Ultrasound of left temporal artery	6%

Jaw claudication is a very specific sign for temporal arteritis. A negative temporal artery biopsy can occur in up to 50 percent of patients, often because the sampled region was not involved in the pathologic process. Therefore, it is not sensitive enough to rule out temporal arteritis. Therefore, because vision is threatened, a brief course of steroids should be initiated.

A 54-year-old female is reviewed in the rheumatology clinic due to dry eyes and arthralgia. A diagnosis of primary Sjogren's syndrome is suspected. Which one of the following features is least associated with this condition?

- ☐ Renal tubular acidosis
- ☐ Xerostomia
- ☐ Sensory polyneuropathy
- ☐ Dilated cardiomyopathy
- ☐ Raynaud's phenomenon

Renal tubular acidosis

17%

Xerostomia

8%

Sensory polyneuropathy

18%

Dilated cardiomyopathy

48%

Raynaud's phenomenon

8%

A 54-year-old man is diagnosed as having gout. You are discussing ways to help prevent future attacks. Which one of the following is most likely to precipitate an attack of gout?

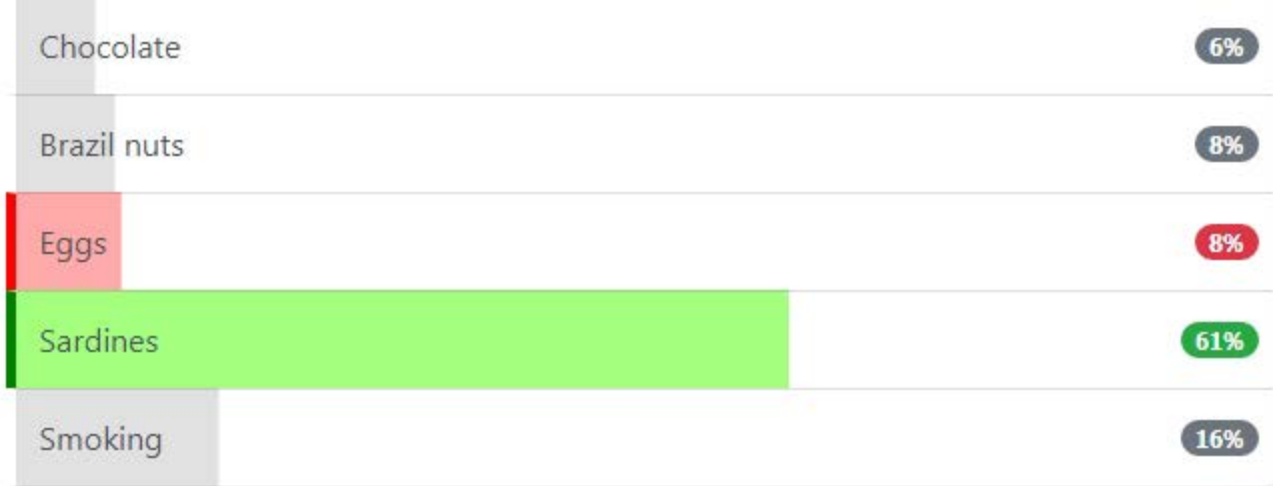
☐ Chocolate

☐ Brazil nuts

☐ Eggs

☐ Sardines

☐ Smoking



Foods to avoid include those high in purines e.g. Liver, kidneys, seafood, oily fish (mackerel, sardines) and yeast products

Which one of the following statements concerning discoid lupus is correct?

- ☐ Commonly progresses to SLE
- ☐ Causes non-scarring alopecia
- ☐ Characterised by follicular keratin plugs
- ☐ Is rarely photosensitive
- ☐ Typically presents in older males

Commonly progresses to SLE

11%

Causes non-scarring alopecia

25%

Characterised by follicular keratin plugs

52%

Is rarely photosensitive

6%

Typically presents in older males

5%

Discoid lupus erythematosus is characterised by follicular keratin plugs

A 72-year-old female known to have osteoporosis is started on alendronate. Which one of the following side-effects is it most important to warn her about?

☐ Sore throat

☐ Heartburn

☐ Headache

☐ Diarrhoea

☐ Palpitations

Sore throat

6%

Heartburn

78%

Headache

4%

Diarrhoea

9%

Palpitations

3%

Bisphosphonates can cause a variety of oesophageal problems

Important for me Less important

Whilst the development of any new problem following the introduction of a new drug warrants medical review it is particularly important to warn patients starting bisphosphonates about symptoms which could suggest an oesophageal reaction, especially with alendronate

Dr Assem

A 47-year-old female is referred to the rheumatology clinic due to cold fingers. Which connective tissue disease is most strongly associated with Raynaud's phenomenon?

- ☐ Systemic lupus erythematosus
- ☐ Rheumatoid arthritis
- ☐ Systemic sclerosis
- ☐ Sjogren's syndrome
- ☐ Polyarteritis nodosa

Systemic lupus erythematosus

14%

Rheumatoid arthritis

6%

Systemic sclerosis

61%

Sjogren's syndrome

14%

Polyarteritis nodosa

5%

Raynaud's phenomenon is associated with all the above conditions but is most strongly linked to systemic sclerosis. Around 2% of women and 6% of men with Raynaud's phenomenon develop systemic sclerosis

A 54-year-old farm worker presents for review. She has recently been diagnosed with osteoarthritis of the hand but has no other past medical history of note. Despite regular paracetamol she is still experiencing considerable pain, especially around the base of both thumbs. What is the most suitable next management step?

- ☐ Add oral diclofenac + lansoprazole
- ☐ Switch paracetamol for co-codamol 8/500
- ☐ Add topical ibuprofen
- ☐ Add oral ibuprofen
- ☐ Add oral glucosamine

Add oral diclofenac + lansoprazole

24%

Switch paracetamol for co-codamol 8/500

6%

Add topical ibuprofen

52%

Add oral ibuprofen

13%

Add oral glucosamine

4%

Osteoarthritis - paracetamol + topical NSAIDs (if knee/hand) first-line

Important for me Less important

The 2008 NICE guidelines suggest the use of paracetamol and topical NSAIDs first-line

A 20-year-old woman is reviewed in the rheumatology clinic. She has been referred due to a three month history of arthralgia, lethargy, muscle pains and Raynaud's phenomenon. On examination she is noted to have slightly swollen hands but no significant synovitis. A number of blood tests are ordered:

Hb	12.9 g/dl
Platelets	282 * 10 ⁹ /l
WBC	6.2 * 10 ⁹ /l

Rheumatoid factor	Negative
ANA	Positive
Anti-dsDNA antibodies	Negative
CRP	25 mg/l
ESR	39 mm/hr
Creatine kinase	675 ng/mL (50-200)

Given the likely diagnosis, which other antibodies are most likely to be present?

☐ Anti-Scl-70
☐ Anti-centromere
☐ Anti-Jo
☐ Anti-RO
☐ Anti-RNP



Anti-ribonuclear protein (anti-RNP) = mixed connective tissue disease

Important for me Less important

This patient has typical features of mixed connective tissue disease (e.g. arthralgia, myositis and Raynaud's). To confirm the diagnosis anti-RNP antibodies need to be detected.

Which one of the following is least associated with the development of gout?

- ☐ Psoriasis
- ☐ Lesch-Nyhan syndrome
- ☐ Lymphoma
- ☐ Lithium toxicity
- ☐ Renal failure

Psoriasis

26%

Lesch-Nyhan syndrome

8%

Lymphoma

14%

Lithium toxicity

49%

Renal failure

4%

Low levels of which one of the following types of complement are associated with the development of systemic lupus erythematosus?

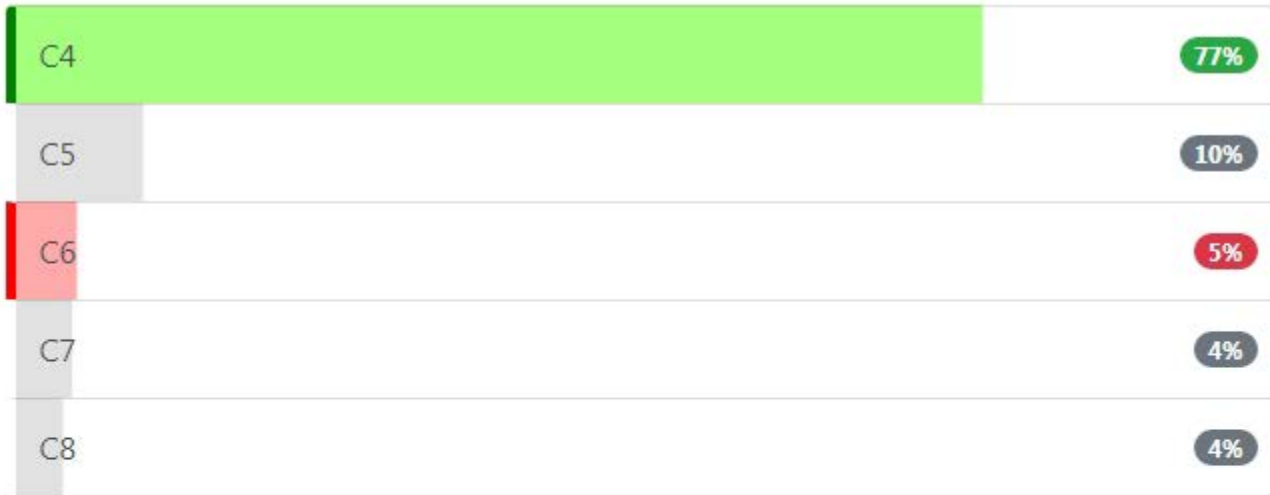
☐ C4

☐ C5

☐ C6

☐ C7

☐ C8



SLE: C3 & C4 low

Important for me Less important

Low levels of C4a and C4b have been shown to be associated with an increased risk of developing systemic lupus erythematosus

Which one of the following is most likely to indicate an underlying connective tissue disorder in a patient with Raynaud's phenomenon?

- ☐ Chilblains
- ☐ Bilateral symptoms
- ☐ Female patient
- ☐ Onset at 18 years old
- ☐ Recurrent miscarriages



Raynaud's disease (i.e. primary) presents in young women with bilateral symptoms

Important for me Less important

A history of recurrent miscarriages could indicate systemic lupus erythematosus or anti-phospholipid syndrome. Chilblains (pernio) are itchy, painful purple swellings which occur on the fingers and toes after exposure to the cold. They are occasionally associated with underlying connective tissue disease but this is rare

Dr. Arshad

A 54-year-old male presents with abdominal pain, testicular pain, weight loss, left foot drop and livedo reticularis. You suspect a diagnosis of polyarteritis nodosa and request a full autoantibody screen. From the options given below, what are you most likely to see when the results of his autoantibody screen returns if the diagnosis is polyarteritis nodosa?

- ☐ Positive anti-CCP
- ☐ Positive rheumatoid factor
- ☐ Anti-RNP
- ☐ No autoantibody is likely to be positive
- ☐ Anti-Smith

Positive anti-CCP	8%
Positive rheumatoid factor	18%
Anti-RNP	14%
No autoantibody is likely to be positive	52%
Anti-Smith	8%

PAN can be difficult to diagnose because findings can be non-specific. The diagnosis should be considered in patients with various combinations of symptoms, such as unexplained fever, arthralgia, subcutaneous nodules, skin ulcers, pain in the abdomen or extremities, new foot drop or wrist drop, or rapidly developing hypertension. The diagnosis is further clarified when clinical findings are combined with certain laboratory results and other causes are excluded.

Diagnosis of PAN is confirmed by biopsy showing necrotizing arteritis or by arteriography showing the typical aneurysms in medium-sized arteries. Magnetic resonance angiography may show microaneurysms, but some abnormalities may be too small for it to detect. Thus, magnetic resonance angiography is not the test used primarily for diagnosis.

Biopsy of clinically uninvolved tissue is often useless because the disease is focal; biopsy should target sites suggested by clinical evaluation. Samples of subcutaneous tissue, sural nerve, and muscle, if thought to be involved, are preferred to samples from the kidneys or liver; kidney and liver biopsies may be falsely negative because of sampling error and may cause bleeding from unsuspected microaneurysms.

Laboratory tests are nonspecific. Leukocytosis up to 20,000 to 40,000/L, proteinuria, and microscopic haematuria are the most common abnormalities. Patients may have thrombocytosis, markedly elevated ESR, anaemia caused by blood loss or renal failure, low serum albumin, and elevated serum immunoglobulins. AST and ALT are often mildly elevated. Testing for hepatitis B and C should be done.

Other testing such as pANCA, cANCA, rheumatoid factor, anti-CCP antibody ANA, C3 and C4 complement levels, cryoglobulin levels, Anti-dsDNA and antibodies to extractable nuclear antigens such as anti-Smith, anti-Ro/SSA, anti-La/SSB, and anti-RNP suggest other diagnoses, such as RA, SLE, or Sjögren syndrome.

Whilst it should be noted that positive ANCA titres (usually of the p-ANCA type) are found in a low percentage (<20%) of patients with classic PAN and indeed are the most likely positive autoantibodies to be found, it does not form part of the diagnostic criteria for the diagnosis and is neither sensitive or specific. It is merely associated and most patients are likely to have negative autoantibodies. Indeed, as previously stated, a strongly positive titre should lead one to suspect another diagnosis.

A 31-year-old woman presents as her fingers intermittently turn white and become painful. She describes the fingers first turning white, then blue and finally red. This is generally worse in the winter months but it is present all year round. Wearing gloves does not help. Clinical examination of her hands, other joints and skin is unremarkable. Which one of the following treatments may be beneficial?

☐ Amitriptyline

☐ Aspirin

☐ Pregabalin

☐ Propranolol

☐ Nifedipine

Amitriptyline

5%

Aspirin

5%

Pregabalin

5%

Propranolol

6%

Nifedipine

79%

Nifedipine is a pharmacological option for Raynaud's phenomenon

Important for me Less important

This lady has Raynaud's disease.

Dr Assem

A 35-year-old female is admitted to the ward following a fall from standing position. She complains of severe pain in her left groin. Her left leg appears to be shortened and externally rotated.

A hip X-ray is performed:

Left hip x-ray	Intertrochanteric fracture of left femoral neck
----------------	---

The patient is referred onto orthopaedics who perform a hemiarthroplasty.

Following this injury you investigate with a DEXA scan:

Right hip T-score	-3.1
Lumbar spine T-score	-2.8

What additional test is useful for confirming a diagnosis of secondary osteoporosis?

- ☐ FRAX
- ☐ Q fracture
- ☐ Z-score
- ☐ MRI whole body
- ☐ Coeliac screen

FRAX	28%
Q fracture	5%
Z-score	39%
MRI whole body	7%
Coeliac screen	21%

A Z-score is helpful in diagnosing secondary osteoporosis and should always be used for children, young adults, pre-menopausal women and men under the age of 50

Important for me Less important

This patient has suffered a fragility fracture. A fragility fracture is defined as a fracture resulting from any fall from a standing height or less. The human body should be able to sustain a fall from this height without a fracture unless there is an underlying cause that makes the bones fragile e.g. osteoporosis. In a young female, we should be concerned about an underlying disease of the bone.

The T score less than -2.5 has confirmed a diagnosis of osteoporosis. The T-score is defined as the number of standard deviations above or below the mean for a healthy 30-year-old adult of the same sex and ethnicity as the patient.

A Z-score is helpful in diagnosing secondary osteoporosis and should always be used for children, young adults, pre-menopausal women and men under the age of 50. A Z-score is similar to a T-score, however it is the number of standard deviations above or below the mean for the patient's age, sex and ethnicity. It is therefore comparing the patients bone density to individuals of a similar age. Abnormal Z-scores confirm a diagnosis of secondary osteoporosis.

FRAX and Q fracture are scoring systems used to quantify the risk of osteoporotic fractures.

Coeliac disease is a relatively common disease, and is a known cause of malnutrition and secondary osteoporosis. However, there are many other causes to consider. Therefore, the best answer is to perform a Z-score. If this confirms the diagnosis, then a full secondary osteoporosis screen should be performed (e.g. check calcium, vitamin D, thyroid function, hormonal levels, coeliac screen).

There is no indication to perform an MRI whole body.

A 33-year-old man who is suspected of having ankylosing spondylitis has a lumbar spine x-ray. Which one of the following features is most likely to be present?

- ☐ Wedge shaped discs
- ☐ Sclerosis
- ☐ 'Rugger-Jersey' spine
- ☐ Osteophytes
- ☐ Subchondral cysts

Wedge shaped discs

15%

Sclerosis

44%

'Rugger-Jersey' spine

17%

Osteophytes

15%

Subchondral cysts

9%

Ankylosing spondylitis - x-ray findings: subchondral erosions, sclerosis and squaring of lumbar vertebrae

Important for me Less important

A 50-year-old diabetic right-handed lady presents with left shoulder pain. She describes a stiff shoulder often more painful at night and has difficulty dressing or doing up her bra. On examination, there is no point tenderness and you notice weakness in external rotation.

What is the most likely cause of her shoulder pain?

- ☐ Acromioclavicular degeneration
- ☐ Subacromial impingement
- ☐ Rotator cuff tear
- ☐ Calcific tendinopathy
- ☐ Adhesive capsulitis

Acromioclavicular degeneration	6%
Subacromial impingement	10%
Rotator cuff tear	17%
Calcific tendinopathy	6%
Adhesive capsulitis	62%

External rotation is classically impaired in adhesive capsulitis

Important for me Less important

Adhesive capsulitis presents as a painful stiff shoulder with restriction of active and passive range of motion in abduction, internal and external rotation. However external rotation often shows the most marked restriction and is the first movement to show impairment. The stem describes difficulty dressing and doing up her bra as well as weakness of external rotation suggesting a globally impaired range of motion. Patients often report difficulty sleeping on the affected side. Other indications that the answer is adhesive capsulitis, include coexisting diabetes, female gender and symptoms in the non-dominant hand, all of which are common findings in this condition

Acromioclavicular degeneration is often associated with popping, swelling, clicking or grindings and a positive scarf test not reported in the stem

Subacromial impingement patients often complain of pain on overhead activities and demonstrate a painful arc of abduction on examination - worse between 90 and 120 degrees. There may also be popping, snapping or grinding.

Rotator cuff tears can occur either due to specific trauma or chronic impingement. Patients will normally describe weakness as well as pain and there may be muscle wasting and tenderness on palpation. There may be a painful arc of movement and weakness of the affected muscle.

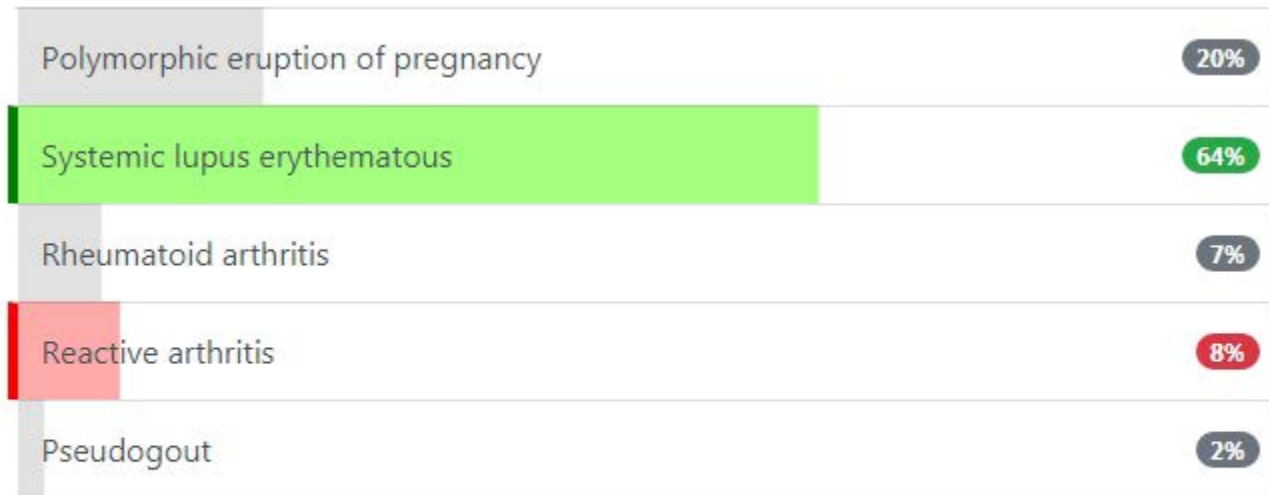
Patients with calcific tendinopathy would normally have tenderness on palpation of the affected area and be reluctant to move the arm. There may be overlap with symptoms of impingement syndrome making this a less likely answer.

A 33-year-old female presents 6 weeks after the birth of her first child with a two-week history of polyarthralgia, fever and a skin rash. First-line investigations show:

ESR	45 mm/hour
-----	------------

What is the most likely diagnosis?

- ☐ Polymorphic eruption of pregnancy
- ☐ Systemic lupus erythematosus
- ☐ Rheumatoid arthritis
- ☐ Reactive arthritis
- ☐ Pseudogout



Unlike many autoimmune diseases systemic lupus erythematosus (SLE) often becomes worse during pregnancy and the puerperium

A 31-year-old female intolerant of methotrexate is started on azathioprine for rheumatoid arthritis. Routine blood monitoring shows:

Hb	7.9 g/dl
Plt	$97 \times 10^9/l$
WBC	$2.7 \times 10^9/l$

Which of the following factors will predispose her to azathioprine toxicity?

- ☐ Cimetidine
- ☐ Rifampicin
- ☐ Fast acetylator status
- ☐ Thiopurine methyltransferase deficiency
- ☐ Alcohol excess

Cimetidine	6%
Rifampicin	6%
Fast acetylator status	8%
Thiopurine methyltransferase deficiency	72%
Alcohol excess	8%

Azathioprine - check thiopurine methyltransferase deficiency (TPMT) before treatment

Important for me Less important

Thiopurine methyltransferase (TPMT) deficiency is present in about 1 in 200 people and predisposes to azathioprine related pancytopenia

Dr. Arsem

A 34-year-old is diagnosed with chronic fatigue syndrome. Which one of the following interventions is most useful?

- ☐ Graded exercise therapy
- ☐ Psychodynamic psychotherapy
- ☐ Graded physiotherapy
- ☐ Advice to avoid alcohol and caffeine
- ☐ Low-dose fluoxetine

Graded exercise therapy

62%

Psychodynamic psychotherapy

15%

Graded physiotherapy

7%

Advice to avoid alcohol and caffeine

7%

Low-dose fluoxetine

9%

Which of the following is least likely to be associated with ankylosing spondylitis?

☐ Apical fibrosis

☐ Achilles tendonitis

☐ Amyloidosis

☐ Achalasia

☐ Heart block

Apical fibrosis

3%

Achilles tendonitis

4%

Amyloidosis

16%

Achalasia

61%

Heart block

15%

Ankylosing spondylitis features - the 'A's

- Apical fibrosis
- Anterior uveitis
- Aortic regurgitation
- Achilles tendonitis
- AV node block
- Amyloidosis

Important for me Less important

Achalasia is not a recognised association of ankylosing spondylitis

A 78-year-old woman is discharged following a fractured neck of femur. On review she is making good progress but consideration is given to secondary prevention of further fractures. What is the most suitable management?

- ☐ Arrange DEXA scan + start strontium ranelate if T-score < -2.5 SD
- ☐ Start oral bisphosphonate
- ☐ Arrange DEXA scan + start oral bisphosphonate if T-score < -1.0 SD
- ☐ Arrange DEXA scan + start hormone replacement therapy if T-score < -2.5 SD
- ☐ Arrange DEXA scan + start oral bisphosphonate if T-score < -1.5 SD

Arrange DEXA scan + start strontium ranelate if T-score < -2.5 SD

6%

Start oral bisphosphonate

65%

Arrange DEXA scan + start oral bisphosphonate if T-score < -1.0 SD

5%

Arrange DEXA scan + start hormone replacement therapy if T-score < -2.5 SD

7%

Arrange DEXA scan + start oral bisphosphonate if T-score < -1.5 SD

17%

NICE guidelines support starting bisphosphonates without waiting for a DEXA scan in such scenarios

A 43-year-old woman presents with pain in the right elbow. This has been present for the past month and she reports no obvious trigger. On examination she reports pain on wrist extension against resistance whilst the elbow is extended. What is the most likely diagnosis?

☐ Cubital tunnel syndrome

☐ Lateral epicondylitis

☐ Carpal tunnel syndrome

☐ Medial epicondylitis

☐ Pronator syndrome

Cubital tunnel syndrome

13%

Lateral epicondylitis

62%

Carpal tunnel syndrome

7%

Medial epicondylitis

12%

Pronator syndrome

7%

A 24-year-old female is investigated for intermittent pain and swelling of the metacarpal phalangeal joints for the past 3 months. An x-ray shows loss of joint space and soft-tissue swelling. Rheumatoid factor is positive and a diagnosis of rheumatoid arthritis is made. What is the most appropriate management to slow disease progression?

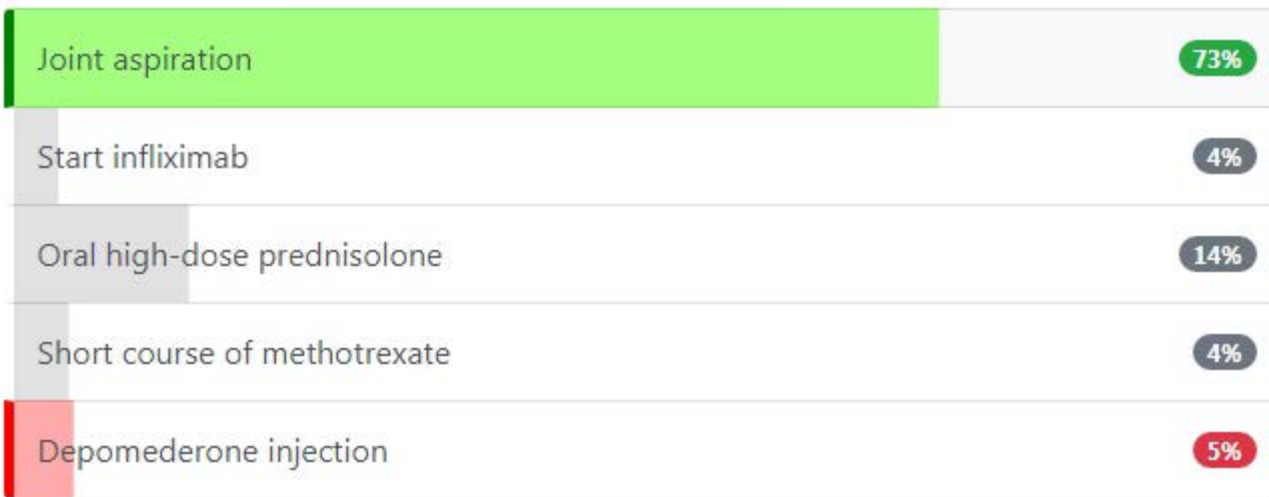
- ☐ Infiximab
- ☐ Rituximab
- ☐ Methotrexate + infliximab + short-course of prednisolone
- ☐ Methotrexate + short-course of prednisolone
- ☐ Diclofenac

Infliximab	6%
Rituximab	4%
Methotrexate + infliximab + short-course of prednisolone	21%
Methotrexate + short-course of prednisolone	65%
Diclofenac	4%

In 2018 NICE updated their rheumatoid arthritis guidelines. They now recommend disease-modifying antirheumatic drug (DMARD) monotherapy with a short-course of bridging prednisolone. In the past dual DMARD therapy was advocated as the initial step.

A 45-year-old female with a history of rheumatoid arthritis presents to the Emergency Department with a two day history of a hot, painful, swollen right elbow joint. What is the most appropriate management?

- ☐ Joint aspiration
- ☐ Start infliximab
- ☐ Oral high-dose prednisolone
- ☐ Short course of methotrexate
- ☐ Depomedrone injection



Joint aspiration is mandatory in all patients with a hot, swollen joint to rule out septic arthritis. If this was excluded in the above patient then intra-articular or system steroid therapy may be considered.

A 45-year-old man presents with a painful swelling on the posterior aspect of his elbow. There is no history of trauma. On examination an erythematous tender swelling is noted. What is the most likely diagnosis?

- ☐ Synovial cyst
- ☐ Haemarthrosis
- ☐ Septic arthritis
- ☐ Gout
- ☐ Olecranon bursitis

Synovial cyst

5%

Haemarthrosis

4%

Septic arthritis

7%

Gout

5%

Olecranon bursitis

80%

A 71-year-old male undergoes an ultrasound scan for an acutely painful right knee associated with swelling. An ultrasound scan confirms the presence of an effusion and states the 'double contour' sign was observed. What is the most likely diagnosis?

☐ Jaccoud's arthropathy

☐ Gout

☐ Septic arthritis

☐ Haemarthrosis

☐ Osteoarthritis

Jaccoud's arthropathy	14%
Gout	35%
Septic arthritis	17%
Haemarthrosis	22%
Osteoarthritis	11%

Gout is one of the commonest forms of inflammatory arthritis. The prevalence appears to be rapidly increasing worldwide. It is mediated by the crystallization of uric acid within the joints. Urate crystals are deposited predominantly in the superficial portions of the articular cartilage. These characteristic cartilaginous deposits are not readily demonstrated with conventional diagnostic imaging including CT or MRI.

Imaging modalities such as plain XR, CT, MRI and bone scintigraphy can provide helpful diagnostic clues. However, disadvantages include lack of specificity (bone scan, MRI), considerable cost (MRI) and the inability to assess early soft tissue changes such as effusion, early erosions, synovial hypertrophy and hypervascularity or small tophi (roentgenography). Typical well-defined, punched out, periarticular erosions with overhanging edges are not seen radiographically until 6-12 yrs after the initial acute attack. The most reliable method of diagnosis is invasive needle aspiration and identification of crystals on polarizing microscopy. However, many physicians do not perform synovial fluid analysis, and therapy is often initiated with an assumed diagnosis.

The most useful characteristic lesion is the double-contour sign a hyperechoic, irregular band over the superficial margin of the joint cartilage, produced by deposition of monosodium urate crystals on the surface of the hyaline cartilage, which increases the interface of the cartilage surface, reaching a thickness similar to the subchondral bone.

In contrast to gout, calcium pyrophosphate crystals tend to aggregate in the middle layer of the hyaline cartilage, parallel to the bony cortex, as a hyperechoic, irregular line embedded in the anechoic-appearing hyaline cartilage, with a normal hyaline cartilage surface. Chondrocalcinosis can thus be readily distinguished from gout.

The double contour sign is not characteristically observed with any of the other answers.

You see a 70-year-old male patient with back pain. He says he has had lower back pain for about 12 months which is slowly getting worse. It now radiates to his buttocks, thighs and legs bilaterally (but his left leg is worse than the right). He describes the pain as 'cramping' and 'burning'. He says that when he walks for more than a few minutes his legs become weak and numb. If he sits down and leans forward the symptoms go. He finds standing exacerbates the symptoms. He is worried as he is losing his independence as he does not feel stable on his feet, he now has a walking aid. His wife thinks he has a more stooped posture than 12 months ago.

His past medical history includes tablet controlled hypertension. He has never smoked and has a normal BMI.

On examination, he has a wide-based gate. Neurological examination of his lower limbs is normal. His peripheral pulses feel normal.

What diagnosis is most likely given the presentation and examination findings?

☐ Ankylosing spondylitis

☐ Spinal stenosis

☐ Sciatica

☐ Vascular claudication

☐ Non-specific lower back pain

Ankylosing spondylitis	6%
Spinal stenosis	77%
Sciatica	9%
Vascular claudication	5%
Non-specific lower back pain	3%

Spinal stenosis is the most likely diagnosis in a patient with gradual onset leg and back pain, weakness and numbness which is brought on by walking (with a normal clinical examination)

Important for me Less important

This man's presentation is most consistent with a diagnosis of spinal stenosis. Spinal stenosis typically presents with gradual onset leg and back pain, weakness and numbness which is brought on by walking. Patients often say that the pain is relieved by sitting and leaning forward and is better if walking up a hill. Physical examination findings are frequently normal in patients with lumbar spinal stenosis. Therefore, the correct answer is 2.

The main differential diagnosis is vascular claudication but he has normal pulses peripherally. Therefore, option 4 is wrong.

Sciatica is more likely to present with unilateral leg pain. Therefore, option 3 is incorrect.

Non-specific lower back pain is common but does not present with lower limb symptoms. Therefore, option 5 is wrong.

A 45-year-old man who is known to have haemochromatosis presents with a swollen and painful right knee. An x-ray shows no fracture but extensive chondrocalcinosis. Given the likely diagnosis, which one of the following is most likely to present in the joint fluid?

- ☐ Raised hyaluronic acid levels
- ☐ Monosodium urate crystals
- ☐ Bipyramidal oxalate crystals
- ☐ Negatively birefringent calcium carbonate crystals
- ☐ Positively birefringent rhomboid-shaped crystals

Raised hyaluronic acid levels

6%

Monosodium urate crystals

6%

Bipyramidal oxalate crystals

5%

Negatively birefringent calcium carbonate crystals

16%

Positively birefringent rhomboid-shaped crystals

68%

Pseudogout - positively birefringent rhomboid shaped crystals

Important for me

Less important

A 27-year-old woman is referred to orthopaedics. Three years she had chemotherapy for non-Hodgkin's lymphoma. Follow up scans to date have shown no evidence of any disease recurrence. For the past two months she has been experiencing gradually increasing pain in her right hip which is worse on exercising. On examination passive movement of the hip is painful in all directions, especially internal rotation. An x-ray ordered by her GP has been reported as normal. What is the most likely diagnosis?

- ☐ Trochanteric bursitis
- ☐ Avascular necrosis of the femoral head
- ☐ Primary hyperparathyroidism
- ☐ Metastatic deposits
- ☐ Hypoparathyroidism

Trochanteric bursitis

16%

Avascular necrosis of the femoral head

75%

Primary hyperparathyroidism

3%

Metastatic deposits

5%

Hypoparathyroidism

2%

Previous chemotherapy is a significant risk factor for avascular necrosis.

Initial x-rays are often normal in patients with avascular necrosis, but it would be unlikely that metastatic deposits significant enough to cause pain would not be shown.

A 70-year-old woman presents with loss of vision in her left eye. For the past two weeks she has painful frontal headaches and has been feeling generally lethargic. On examination visual acuity is 6/9 in the right eye but on the left side only hand movements can be made seen. Fundoscopy of the left side reveals a pale and oedematous optic disc. What is the most likely diagnosis?.

- ☐ Acute angle closure glaucoma
- ☐ Central retinal artery occlusion
- ☐ Multiple sclerosis
- ☐ Methanol poisoning
- ☐ Temporal arteritis



This patient has likely developed anterior ischemic optic neuropathy on the left side

Which one of the following cells secretes the majority of tumour necrosis factor in humans?

- ☐ Neutrophils
- ☐ Macrophages
- ☐ Natural killer cells
- ☐ Killer-T cells
- ☐ Helper-T cells

Neutrophils

8%

Macrophages

54%

Natural killer cells

17%

Killer-T cells

10%

Helper-T cells

10%

Which one of the following features is least typical of polymyalgia rheumatica?

- ☐ Elevated creatine kinase
- ☐ Low-grade fever
- ☐ Morning stiffness in proximal limb muscles
- ☐ Polyarthralgia
- ☐ Anorexia

Elevated creatine kinase

48%

Low-grade fever

5%

Morning stiffness in proximal limb muscles

13%

Polyarthralgia

10%

Anorexia

23%

A 33-year-old woman presents with back pain which radiates down her right leg. This came on suddenly when she was bending down to pick up her child. On examination straight leg raising is limited to 30 degrees on the right hand side due to shooting pains down her leg. Sensation is reduced on the dorsum of the right foot, particularly around the big toe and foot dorsiflexion is also weak. The ankle and knee reflexes appear intact. A diagnosis of disc prolapse is suspected. Which nerve root is most likely to be affected?

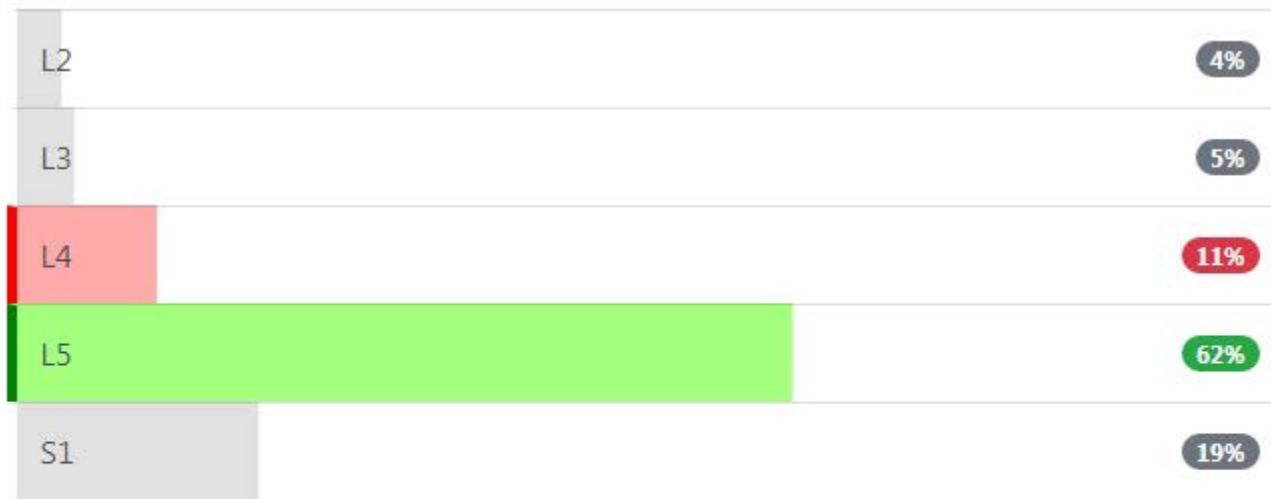
☐ L2

☐ L3

☐ L4

☐ L5

☐ S1



L5 lesion features = loss of foot dorsiflexion + sensory loss dorsum of the foot

Important for me Less important

A 48-year-old female with left sided pins and needles in her left thumb, index and middle finger for several months, has been diagnosed with carpal tunnel syndrome. What features in her past medical history has predisposed her to the condition?

- ☐ High blood pressure
- ☐ Prednisolone use
- ☐ Obesity
- ☐ Hormone replacement therapy
- ☐ Previous contraceptive pill use

High blood pressure

3%

Prednisolone use

15%

Obesity

65%

Hormone replacement therapy

6%

Previous contraceptive pill use

10%

Obesity is a proven independent risk factor in those under 63 years. The others are not proven risk factors. ref: Bland JD. The relationship of obesity, age, and carpal tunnel syndrome: more complex than was thought? Muscle Nerve. 2005 Oct;32(4):527-32.

Prednisolone use, hormone replacement therapy and using the contraceptive pill are not proven risk factors and no connection has been found between them and increased risk carpal tunnel syndrome. ref: Geoghegan JM1, Clark DI, Bainbridge LC, Smith C, Hubbard R. Risk factors in carpal tunnel syndrome.J Hand Surg Br. 2004 Aug;29(4):315-20 and ref: American Academy of Orthopaedic Surgeons. Management of Carpal Tunnel Syndrome Evidence-Based Clinical Practice Guideline. www.aaos.org/ctsguideline. Published February 29, 2016

A 60-year-old woman who has recently started treatment for polymyalgia rheumatica presents with a five day history of headaches and reduced vision on the right side since this morning. There is no eye pain but there is a 'large, dark shadow' covering the superior visual field on the right side. On examination she has a tender, palpable right temporal artery. What is the most likely explanation for the reduced vision?

- ☐ Anterior ischemic optic neuropathy
- ☐ Central retinal vein occlusion
- ☐ Optic neuritis
- ☐ Ophthalmic arteritis
- ☐ Central retinal artery occlusion

Anterior ischemic optic neuropathy

61%

Central retinal vein occlusion

4%

Optic neuritis

9%

Ophthalmic arteritis

16%

Central retinal artery occlusion

10%

A 25-year-old man presents with back pain. Which one of the following may suggest a diagnosis of ankylosing spondylitis?

- ☐ Rapid onset
- ☐ Gets worse following exercise
- ☐ Bone tenderness
- ☐ Pain at night
- ☐ Improves with rest

Rapid onset

9%

Gets worse following exercise

10%

Bone tenderness

9%

Pain at night

62%

Improves with rest

11%

Which one of the following is most recognised as a potential complication in a patient with ankylosing spondylitis?

- ☐ Heart block
- ☐ Aortic stenosis
- ☐ Achalasia
- ☐ Diabetes mellitus
- ☐ Bronchiectasis

Heart block

60%

Aortic stenosis

20%

Achalasia

9%

Diabetes mellitus

4%

Bronchiectasis

7%

Ankylosing spondylitis features - the 'A's

- Apical fibrosis
- Anterior uveitis
- Aortic regurgitation
- Achilles tendonitis
- AV node block
- Amyloidosis

Important for me Less important

A 55-year-old woman presents with a four week history of shoulder pain. There has been no obvious precipitating injury and no previous experience. The pain is worse on movement and there is a grating sensation if she moves the arm too quickly. She also gets pain at night, particularly when she lies on the affected shoulder. On examination there is no obvious erythema or swelling. Passive abduction is painful between between 60 and 120 degrees. She is unable to abduct the arm herself past 70-80 degrees. Flexion and extension are preserved. What is the most likely diagnosis?

☐ Adhesive capsulitis (frozen shoulder)

☐ Supraspinatus tendonitis

☐ Acromioclavicular joint injury

☐ Glenohumeral arthritis

☐ Superior labral lesion

Dr Assem

Adhesive capsulitis (frozen shoulder)

35%

Supraspinatus tendonitis

46%

Acromioclavicular joint injury

9%

Glenohumeral arthritis

6%

Superior labral lesion

4%

This patient has a classic 'painful arc' which is a sign of shoulder impingement, most commonly secondary to supraspinatus tendonitis.

A 71-year-old man presents with an erythematous, swollen first metatarsophalangeal joint on the left foot. This is causing him considerable pain and he is having difficulty walking. He has never had any previous similar episodes. His past medical history includes atrial fibrillation and type 2 diabetes mellitus and his current medications are warfarin, metformin and simvastatin. What is the most appropriate treatment of this episode?

☐ Intra-articular corticosteroid

☐ Colchicine

☐ Ibuprofen

☐ Diclofenac

☐ Prednisolone

Intra-articular corticosteroid

7%

Colchicine

66%

Ibuprofen

16%

Diclofenac

8%

Prednisolone

4%

NSAIDs should be avoided in elderly patients taking warfarin due to the risk of a life-threatening gastrointestinal haemorrhage. Oral steroids are an option but would upset his diabetic control.

Whilst anticoagulation is not a contraindication to joint injection it would make this option less attractive

A 44-year-old woman presents with pain in her right hand and forearm which has been getting worse for the past few weeks. There is no history of trauma. The pain is concentrated around the thumb and index finger and is often worse at night. Shaking her hand seems to provide some relief. On examination there is weakness of the abductor pollicis brevis and reduced sensation to fine touch at the index finger. What is the most likely diagnosis?

- ☐ C6 entrapment neuropathy
- ☐ Thoracic outlet syndrome
- ☐ Carpal tunnel syndrome
- ☐ Cervical rib
- ☐ Pancoast's tumour

C6 entrapment neuropathy

25%

Thoracic outlet syndrome

6%

Carpal tunnel syndrome

60%

Cervical rib

5%

Pancoast's tumour

4%

More proximal symptoms would be expected with a C6 entrapment neuropathy e.g. weakness of the biceps muscle or reduced biceps reflex.

Patients with carpal tunnel syndrome often get relief from shaking their hands and this may be an important clue in exam questions.

A 31-year-old woman who had rheumatoid arthritis diagnosed 5 years ago asks for advice as she is considering starting a family. She currently has quiescent rheumatoid arthritis which is well controlled on methotrexate. Which one of the following drugs is it safest to use if she is planning on becoming pregnant?

- ☐ Leflunamide
- ☐ Sulfasalazine
- ☐ Methotraxate
- ☐ Rituximab
- ☐ Gold

Leflunamide

22%

Sulfasalazine

57%

Methotrexate

6%

Rituximab

9%

Gold

5%

A 27-year-old woman presents with painful genital ulceration. She has had recurrent attacks for the past four years. Oral aciclovir has had little effect on the duration of her symptoms. She has also noticed for the past year almost weekly attacks of mouth ulcers which again are slow to heal. Her only past medical history of note is being treated for thrombophlebitis two years ago. What is the most likely diagnosis?

- ☐ Behcet's syndrome
- ☐ Polyarteritis nodosa
- ☐ Systemic lupus erythematosus
- ☐ Sarcoidosis
- ☐ Herpes simplex virus type 2

Behcet's syndrome

86%

Polyarteritis nodosa

3%

Systemic lupus erythematosus

4%

Sarcoidosis

2%

Herpes simplex virus type 2

6%

The presence of anti-cyclic citrullinated peptide antibody is suggestive of which one of the following conditions?

☐ Systemic lupus erythematosus

☐ Rheumatoid arthritis

☐ Type 1 diabetes mellitus

☐ Addison's disease

☐ Dermatomyositis

Systemic lupus erythematosus	8%
Rheumatoid arthritis	82%
Type 1 diabetes mellitus	2%
Addison's disease	2%
Dermatomyositis	6%

Anti-cyclic citrullinated peptide antibodies are associated with rheumatoid arthritis

Important for me Less important

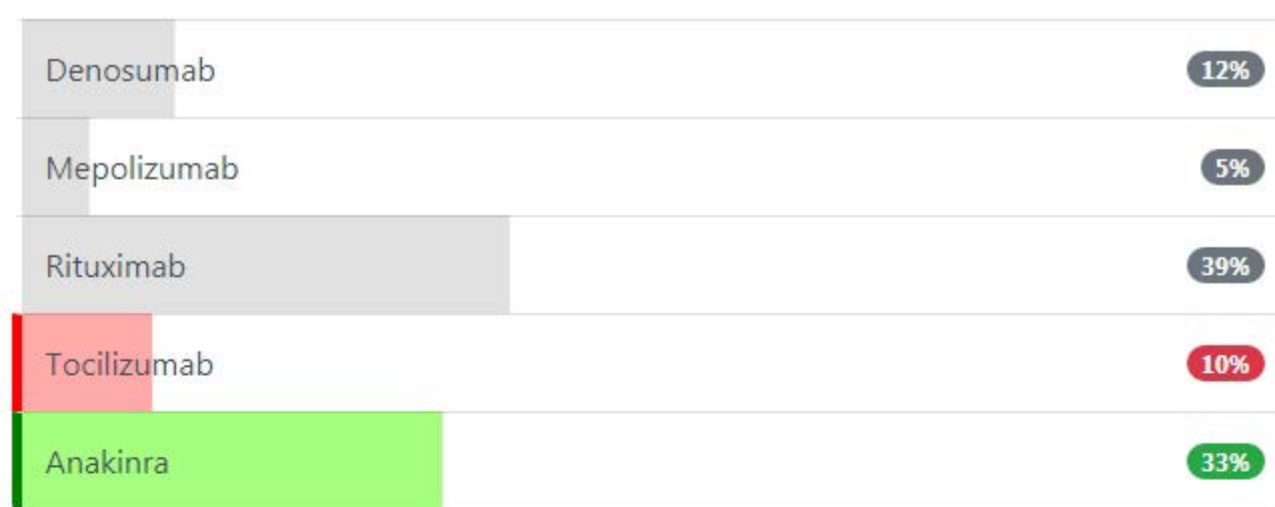
Anti-cyclic citrullinated peptide antibody may be detectable up to 10 years before the development of rheumatoid arthritis. It may therefore play a key role in the future of rheumatoid arthritis, allowing early detection of patients suitable for aggressive anti-TNF therapy. It has a sensitivity similar to rheumatoid factor (70-80%, see below) with a much higher specificity of 90-95%.

Dr. Arsem

A 29-year-old with adult onset Still's comes to the rheumatology clinic for review. She still has significant symptoms including joint pains and a persistent skin rash despite methotrexate and etanercept. Examination reveals a macular erythematous rash and active synovitis. CRP is elevated at 95 mg/l.

Which of the following is the most appropriate next intervention?

- ☐ Denosumab
- ☐ Mepolizumab
- ☐ Rituximab
- ☐ Tocilizumab
- ☐ Anakinra



The evidence is very strong to support the use of IL-1 inhibition for adult onset Still's disease. A review of published data estimated the overall remission rate at over 80%, and complete remission rate at approximately 66%. Anakinra competitively inhibits the action of IL-1 by binding to the IL-1 receptor and plasma levels correlate well with IL-1 in synovial fluid and presence of synovitis.

Denosumab is a RANK ligand inhibitor used in the treatment of osteoporosis. Mepolizumab is used in the treatment of severe asthma with elevated eosinophils. There is some evidence to support the use of tocilizumab, an anti-IL6 monoclonal antibody in adult onset Still's, but there is stronger data to support a role for tocilizumab in the treatment of rheumatoid arthritis. Rituximab is usually instigated in patients who fail to respond to anakinra.

<https://www.evidence.nhs.uk/formulary/bnf/current/10-musculoskeletal-and-joint-diseases/101-drugs-used-in-rheumatic-diseases-and-gout/1013-drugs-that-suppress-the-rheumatic-disease-process/cytokine-modulators/anakinra>

Which one of the following is not a risk factor for developing osteoporosis?

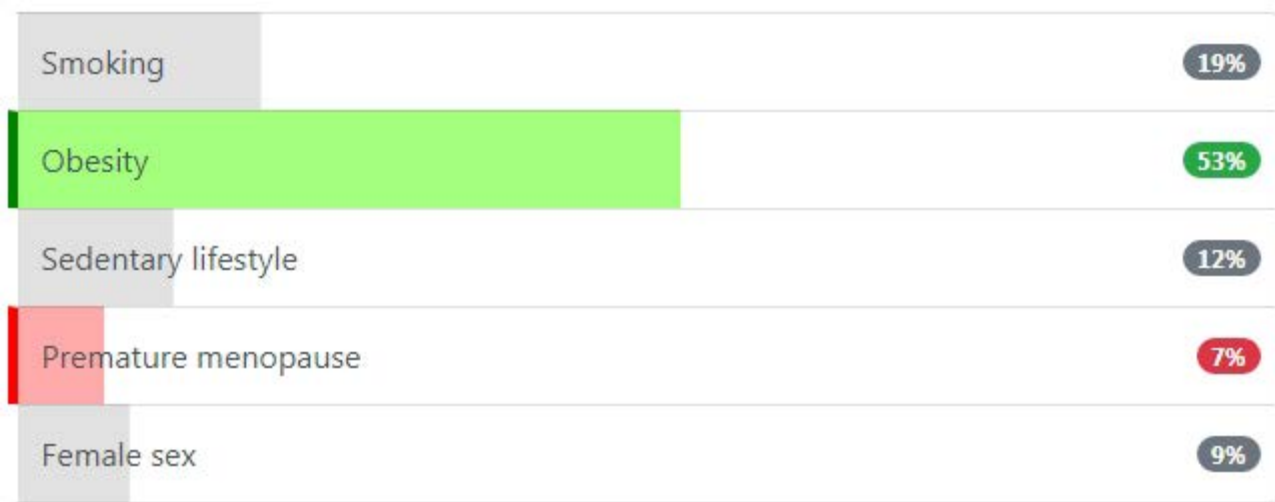
☐ Smoking

☐ Obesity

☐ Sedentary lifestyle

☐ Premature menopause

☐ Female sex



Low body mass, rather than obesity is associated with an increased risk of developing osteoporosis

What is the minimum steroid intake a patient should be taking before they are offered osteoporosis prophylaxis?

- Equivalent of prednisolone 10 mg or more each day for 6 months
- Equivalent of prednisolone 7.5 mg or more each day for 6 weeks
- Equivalent of prednisolone 5 mg or more each day for 6 weeks
- Equivalent of prednisolone 7.5 mg or more each day for 3 months
- Equivalent of prednisolone 10 mg or more each day for 6 weeks

Equivalent of prednisolone 10 mg or more each day for 6 months

8%

Equivalent of prednisolone 7.5 mg or more each day for 6 weeks

16%

Equivalent of prednisolone 5 mg or more each day for 6 weeks

12%

Equivalent of prednisolone 7.5 mg or more each day for 3 months

52%

Equivalent of prednisolone 10 mg or more each day for 6 weeks

13%

Approximately what percentage of patients with psoriasis develop an associated arthropathy?

☐ 0.5%

☐ 30-40%

☐ 4-5%

☐ 1%

☐ 10-20%

0.5%

4%

30-40%

19%

4-5%

15%

1%

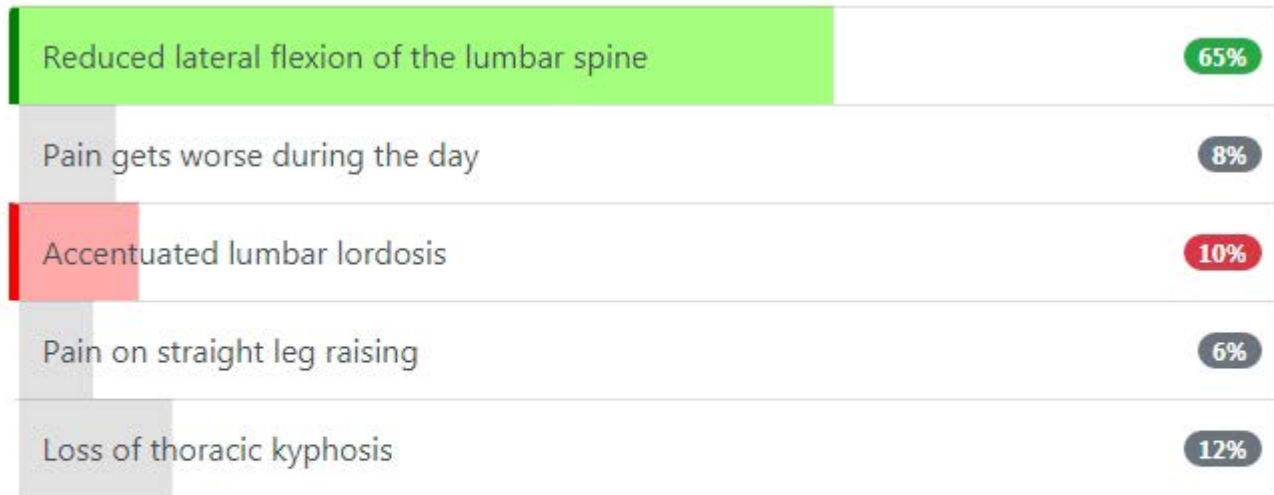
5%

10-20%

56%

A 24-year-old man is investigated for chronic back pain. Which one of the following would most suggest a diagnosis of ankylosing spondylitis?

- ☐ Reduced lateral flexion of the lumbar spine
- ☐ Pain gets worse during the day
- ☐ Accentuated lumbar lordosis
- ☐ Pain on straight leg raising
- ☐ Loss of thoracic kyphosis



Reduced lateral flexion of the lumbar spine is one of the earliest signs of ankylosing spondylitis. There tends to be a loss of lumbar lordosis and an accentuated thoracic kyphosis in patients with ankylosing spondylitis

A 50-year-old woman complains of pain in her right elbow. This has been present for the past four weeks and is maximal around 4-5cm distal from the lateral aspect of the elbow joint. The pain is made worse by extending the elbow and pronating the forearm. What is the most likely diagnosis?

- ☐ Lateral epicondylitis
- ☐ Radial tunnel syndrome
- ☐ De Quervain's tenosynovitis
- ☐ Cubital tunnel syndrome
- ☐ Medial epicondylitis

A 50-year-old woman complains of pain in her right elbow. This has been present for the past four weeks and is maximal around 4-5cm distal from the lateral aspect of the elbow joint. The pain is made worse by extending the elbow and pronating the forearm. What is the most likely diagnosis?

Lateral epicondylitis

30%

Radial tunnel syndrome

45%

De Quervain's tenosynovitis

5%

Cubital tunnel syndrome

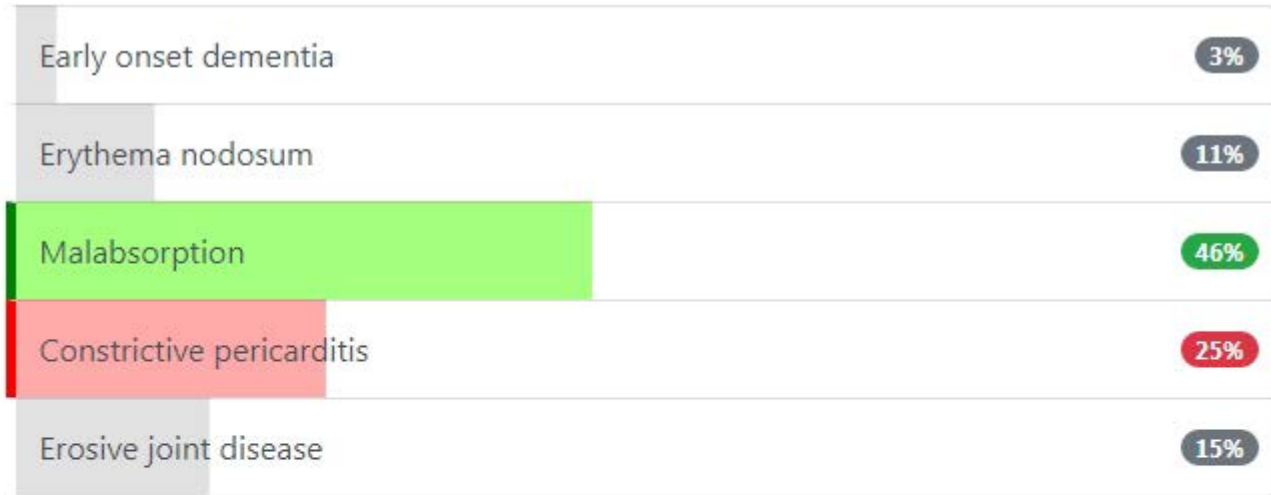
14%

Medial epicondylitis

8%

A 44-year-old female with a history of Raynaud's phenomenon is reviewed in the rheumatology clinic. She is currently being investigated for dysphagia. On examination she is noted to have tight, shiny skin over her fingers. Which one of the following complications is she most likely to develop?

- ☐ Early onset dementia
- ☐ Erythema nodosum
- ☐ Malabsorption
- ☐ Constrictive pericarditis
- ☐ Erosive joint disease



This patient is likely to have CREST syndrome, a subtype of limited cutaneous systemic sclerosis. Malabsorption can develop in these patients secondary to bacterial overgrowth of the sclerosed small intestine

Whilst diffuse systemic sclerosis is associated with more severe and rapid internal organ involvement it is also seen in the limited form.

A 24-year-old with a history of Crohn's disease is started on azathioprine. What is the mechanism of action of azathioprine?

- ☐ Inhibits purine synthesis
- ☐ Inhibits inosine monophosphate dehydrogenase
- ☐ Mercaptopurine antagonist
- ☐ Thiopurine methyltransferase inhibitor
- ☐ Causes cross-linking in DNA

Inhibits purine synthesis

43%

Inhibits inosine monophosphate dehydrogenase

4%

Mercaptopurine antagonist

15%

Thiopurine methyltransferase inhibitor

34%

Causes cross-linking in DNA

4%

Azathioprine is metabolised to the active compound mercaptopurine, a purine analogue that inhibits purine synthesis

Important for me Less important

A 54-year-old male presents with weakness of his upper arms. On examination he is found to have a macular rash over his back and the extensor aspects of his upper arms. He is a heavy smoker and his sodium is 121 mmol/l. What is the most likely underlying diagnosis?

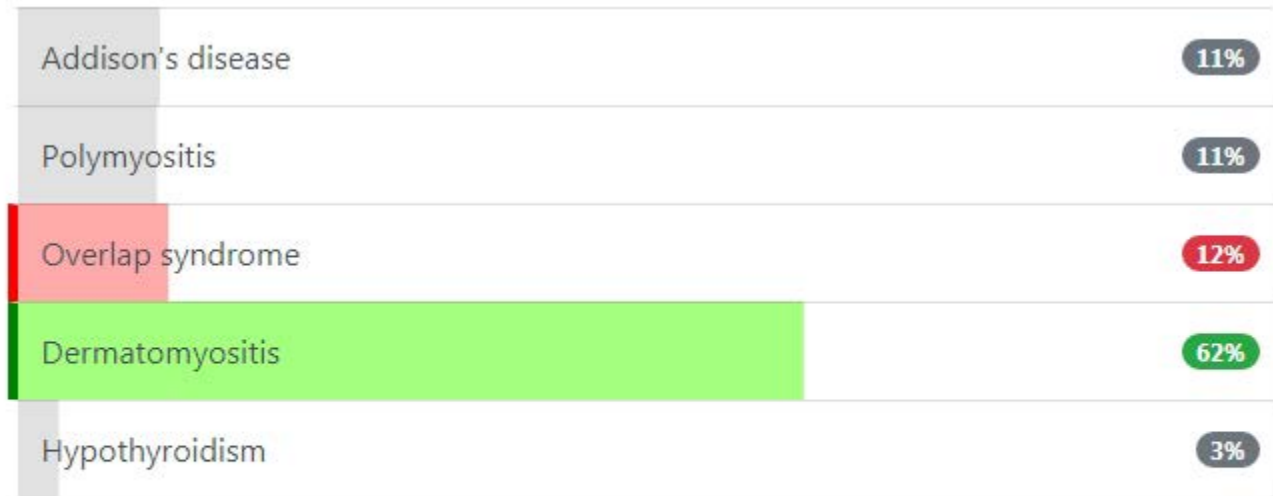
☐ Addison's disease

☐ Polymyositis

☐ Overlap syndrome

☐ Dermatomyositis

☐ Hypothyroidism



This man may have an underlying small cell lung cancer causing Syndrome of Inappropriate Antidiuretic Hormone Secretion.

A 54-year-old lady presents with one-month history of worsening right groin pain. The pain is worse on walking and she has developed a limp. She has a background of systemic lupus erythematosus and is on long-term hydroxychloroquine with a recent course of prednisolone for an acute flare. On examination, the patient has pain and reduced range of movement particularly on internal rotation of the right hip.

Which of the following is the most sensitive investigation to confirm the likely diagnosis?

- ☐ Pelvic x-ray
- ☐ MRI right hip
- ☐ CT hip
- ☐ Anti-phospholipid antibodies
- ☐ Right hip aspiration and microscopy

Pelvic x-ray	11%
MRI right hip	74%
CT hip	7%
Anti-phospholipid antibodies	4%
Right hip aspiration and microscopy	4%

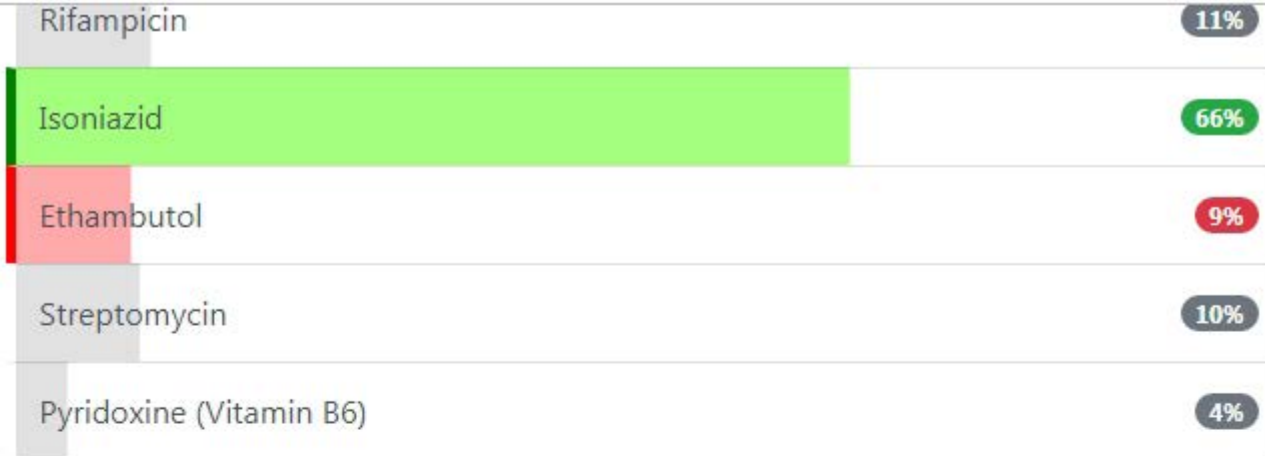
This patient has avascular necrosis of her right femoral head due to both her history of systemic lupus erythematosus and recent steroid use. The most sensitive investigation is MRI scanning. X-rays may show increased density of the femoral head in advanced cases. In practice, x-rays would usually be done first-line.

Explanations for other options:

- 1. In practice, pelvic x-rays would usually be done first-line but they may be normal in early cases of avascular necrosis.
- 3. CT scan of the hip is not as sensitive as MRI scanning.
- 4. Antiphospholipid antibodies are a possible cause of avascular necrosis but would not confirm the diagnosis.
- 5. Hip aspiration and microscopy would not be useful in diagnosing avascular necrosis. It is helpful in cases of possible septic arthritis, gout or pseudogout, none of which are suggested by this history.

A 34-year-old businessman presented to the hospital with a low-grade fever, blood-streaked sputum and a dry cough for 7 weeks. He had been travelling extensively in India, staying in cheap and unsanitary accommodations. You decide to send him for further testing which confirms a diagnosis of tuberculosis. He is started on the correct antibiotics. Two weeks later, he presents to your outpatient clinic with joint pain, fatigue and a new rash. The rash is confined to his face and shaped like a butterfly. You suspect drug-induced lupus, which one of these drugs is responsible for his condition?

- ☐ Rifampicin
- ☐ Isoniazid
- ☐ Ethambutol
- ☐ Streptomycin
- ☐ Pyridoxine (Vitamin B6)



Isoniazid can cause drug-induced lupus

Important for me Less important

This patient has TB and is started on anti-TB drugs. There are a few side-effect profiles which are specific to these drugs.

Rifampicin- this is a CYP450 enzyme inducer and can stain secretions such as sweat or urine an orange-red colour.

Isoniazid- this is a CYP450 enzyme inhibitor and can cause drug-induced lupus and peripheral neuropathy. Therefore pyridoxine is given which is a vitamin B6 and this reduces the risk of neuropathies.

Streptomycin- this is an aminoglycoside which is toxic to kidney and ears.

Pyridoxine- This is a supplement and does not cause drug-induced lupus.

A 70-year-old woman is reviewed. She sustained a fracture of her wrist one year ago, following which a DEXA scan was performed. This showed a T-score of -2.8 SD. Calcium and vitamin D supplementation was started along with oral alendronate. This however was stopped due to oesophagitis. In accordance with NICE guidelines, what is the most suitable next management step?

- ☐ Start hormone replacement therapy
- ☐ Start raloxifene
- ☐ Start teriparatide
- ☐ Switch to risedronate
- ☐ Refer for hip protectors

Start hormone replacement therapy

6%

Start raloxifene

24%

Start teriparatide

8%

Switch to risedronate

60%

Refer for hip protectors

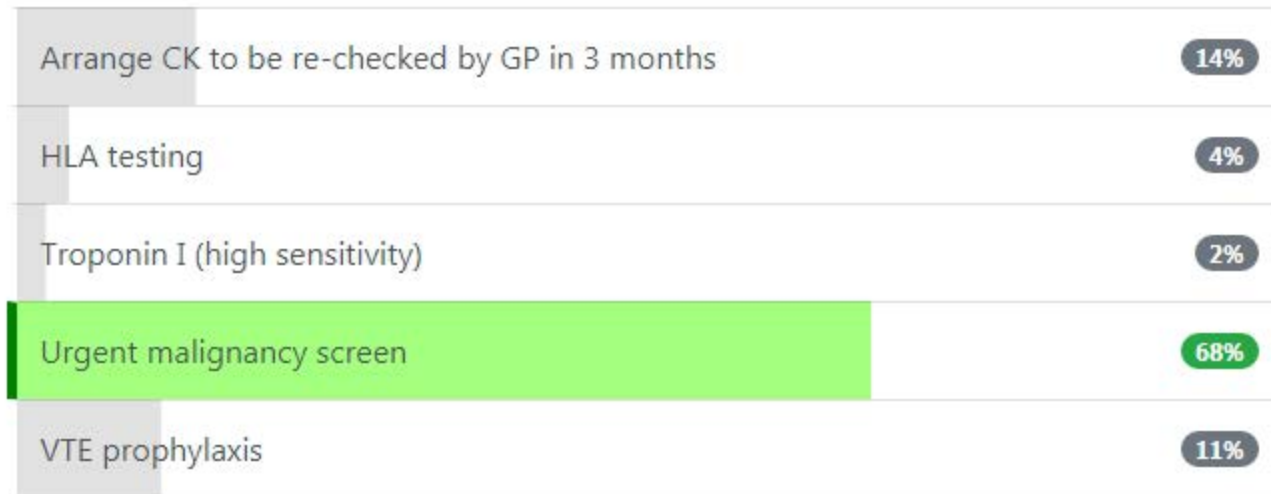
2%

The 2008 NICE guidelines suggest switching to risedronate or etidronate in patients unable to tolerate alendronate

A 64-year-old female presents with difficulty brushing her hair and standing up after sitting in her chair. There is a purple heliotropic rash above both eyes and a symmetrical erythematous papular rash over both hands. Blood tests identify a CK of 9543 and anti-nuclear antibody testing is positive. You make a diagnosis of dermatomyositis and initiate treatment with steroids.

What is the most important next step?

- ☐ Arrange CK to be re-checked by GP in 3 months
- ☐ HLA testing
- ☐ Troponin I (high sensitivity)
- ☐ Urgent malignancy screen
- ☐ VTE prophylaxis



In patients with a new diagnosis of dermatomyositis, urgent malignancy screen is needed

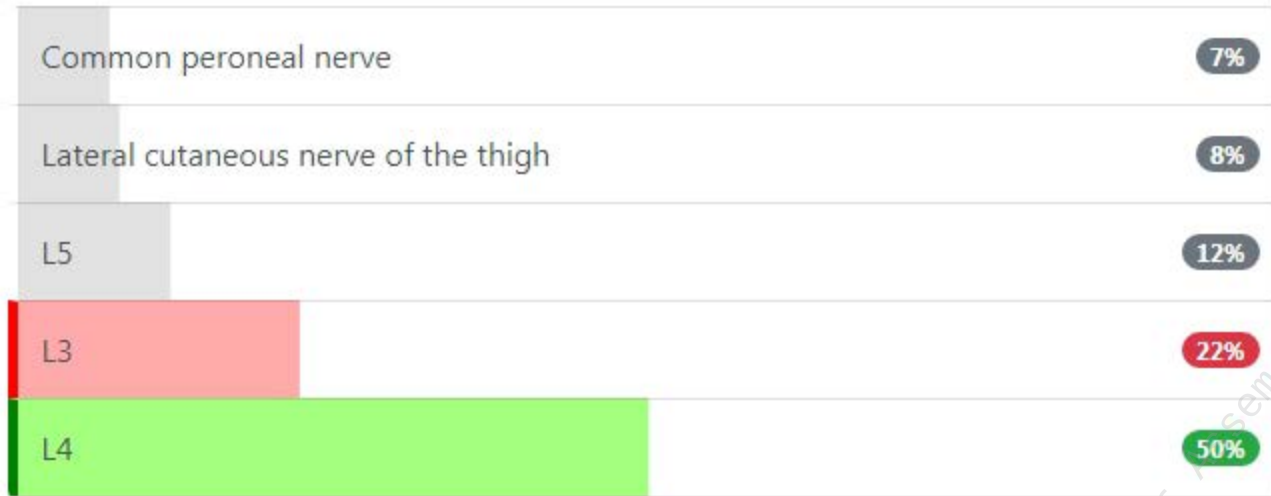
Important for me **Less important**

Almost a quarter of individuals diagnosed with dermatomyositis have an underlying malignancy (typically ovarian, breast and lung cancer), this prevalence increases in the elderly.

Serial CK measurement can be part of monitoring response to treatment but is not the most important next step. HLA testing is not part of the workup for dermatomyositis. Screening for cardiac involvement may be undertaken in idiopathic inflammatory myopathies but is not the most important next step. VTE prophylaxis is not indicated.

A 40-year-old man presents with pain in his lower back and 'sciatica' for the past three days. He describes bending down to pick up a washing machine when he felt 'something go'. He now has severe pain radiating from his back down the right leg. On examination he describes paraesthesia over the anterior aspect of the right knee and the medial aspect of his calf. Power is intact and the right knee reflex is diminished. The femoral stretch test is positive on the right side. Which nerve root is most likely to be affected?

- ☐ Common peroneal nerve
- ☐ Lateral cutaneous nerve of the thigh
- ☐ L5
- ☐ L3
- ☐ L4



Which of the following features are not typically seen in a patient with adult onset Still's disease?

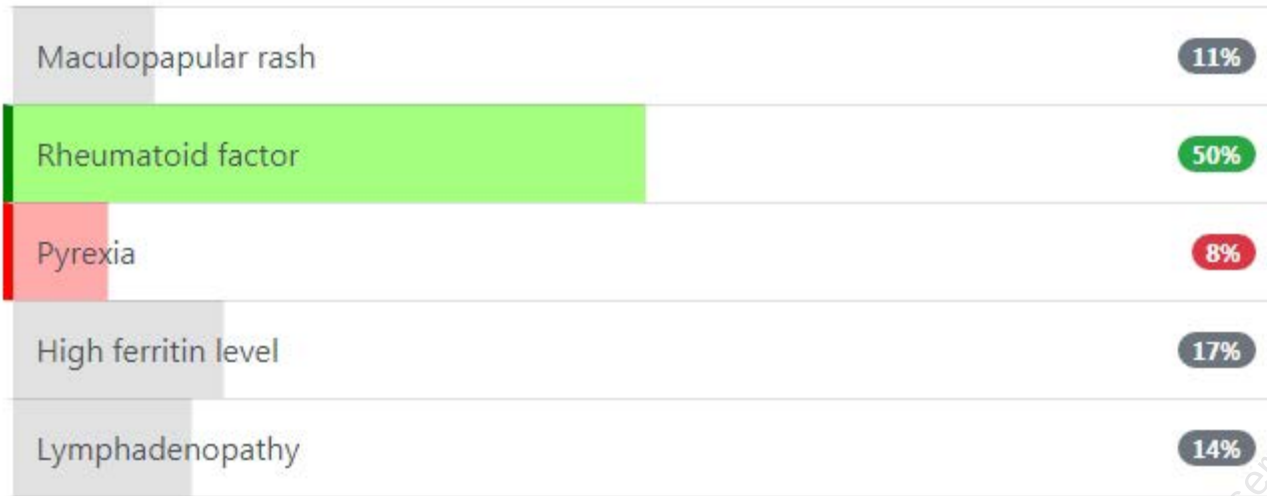
☐ Maculopapular rash

☐ Rheumatoid factor

☐ Pyrexia

☐ High ferritin level

☐ Lymphadenopathy



Adult onset Still's disease is typically rheumatoid factor negative

A 34-year-old woman with a history of antiphospholipid syndrome presents with a swollen and painful leg. Doppler ultrasound confirms a deep vein thrombosis (DVT). She had a previous DVT 4 months ago and was taking warfarin (with a target INR of 2-3) when the DVT occurred. How should her anticoagulation be managed?

- ☐ Life-long warfarin, increase target INR to 3 - 4
- ☐ Add in life-long low-dose aspirin
- ☐ A further 6 months warfarin, target INR 2 - 3
- ☐ A further 6 months warfarin, target INR 3 - 4
- ☐ Life-long warfarin, target INR 2 - 3

Life-long warfarin, increase target INR to 3 - 4	69%
Add in life-long low-dose aspirin	6%
A further 6 months warfarin, target INR 2 - 3	5%
A further 6 months warfarin, target INR 3 - 4	9%
Life-long warfarin, target INR 2 - 3	11%

The evidence base is scanty here but most clinicians would increase the target INR to 3-4 if a patient has had a further thrombosis with an INR of 2-3. Please see the BCSH guidelines

In line with NICE guidelines on the secondary prevention of osteoporotic fractures in postmenopausal women, which one of the following patients should not automatically be started on treatment?

- A 81-year-old woman who has had a fractured neck of femur
- A 64-year-old women with a wedge fractures of her thoracic spine. DEXA scan shows a T-score of -3.1 SD
- A 55-year-old women who had a Colles fracture of the wrist. DEXA scan shows a T-score of -3.3 SD
- A 64-year-old women with a BMI of 18 kg/m². She has a wedge fractures of her thoracic spine. DEXA scan shows a T-score of -2.7 SD
- A 71-year-old women who had a Colles fracture of the wrist. DEXA scan shows a T-score of -2.1 SD

A 81-year-old woman who has had a fractured neck of femur

14%

A 64-year-old women with a wedge fractures of her thoracic spine. DEXA scan shows a T-score of -3.1 SD

4%

A 55-year-old women who had a Colles fracture of the wrist. DEXA scan shows a T-score of -3.3 SD

11%

A 64-year-old women with a BMI of 18 kg/m². She has a wedge fractures of her thoracic spine. DEXA scan shows a T-score of -2.7 SD

9%

A 71-year-old women who had a Colles fracture of the wrist. DEXA scan shows a T-score of -2.1 SD

61%

Which one of the following statements regarding ankylosing spondylitis is correct?

- ☐ Schober's test assesses reduced chest expansion
- ☐ HLA-B27 is positive in 50% of patients
- ☐ Achilles tendonitis is a recognised association
- ☐ It is equally common in men and women
- ☐ The typical age of presentation is between 40-50 years

Schober's test assesses reduced chest expansion

7%

HLA-B27 is positive in 50% of patients

15%

Achilles tendonitis is a recognised association

62%

It is equally common in men and women

8%

The typical age of presentation is between 40-50 years

7%

HLA-B27 is positive in 90% of patients.

Dr Assef

What is the mode of action of bisphosphonates?

- ☐ Promotes osteoblasts
- ☐ Promotes calcium absorption
- ☐ Antagonist of PTH
- ☐ Inhibit osteoclasts
- ☐ Promotes phosphate excretion

Promotes osteoblasts

13%

Promotes calcium absorption

7%

Antagonist of PTH

3%

Inhibit osteoclasts

75%

Promotes phosphate excretion

3%

Bisphosphonates inhibit osteoclasts

Important for me Less important

A 46-year-old female presents with a burning sensation over the antero-lateral aspect of her right thigh. A diagnosis of meralgia paraesthetica is suspected. Which nerve is most likely to be affected?

- ☐ Common peroneal nerve
- ☐ Anterior cutaneous nerve of thigh
- ☐ Posterior cutaneous nerve of thigh
- ☐ Lateral cutaneous nerve of thigh
- ☐ Sciatic nerve

Common peroneal nerve

7%

Anterior cutaneous nerve of thigh

20%

Posterior cutaneous nerve of thigh

5%

Lateral cutaneous nerve of thigh

62%

Sciatic nerve

5%

Burning thigh pain - ? meralgia paraesthetica - lateral cutaneous nerve of thigh compression

Important for me Less important

A 33-year-old female is admitted to the Emergency Department due to right-sided weakness. She has a past history of deep vein thrombosis following the birth of her daughter. The only other past history of note is two miscarriages. A CT head confirms an ischaemic stroke in the left middle cerebral artery territory. What is the likely finding on echocardiography?

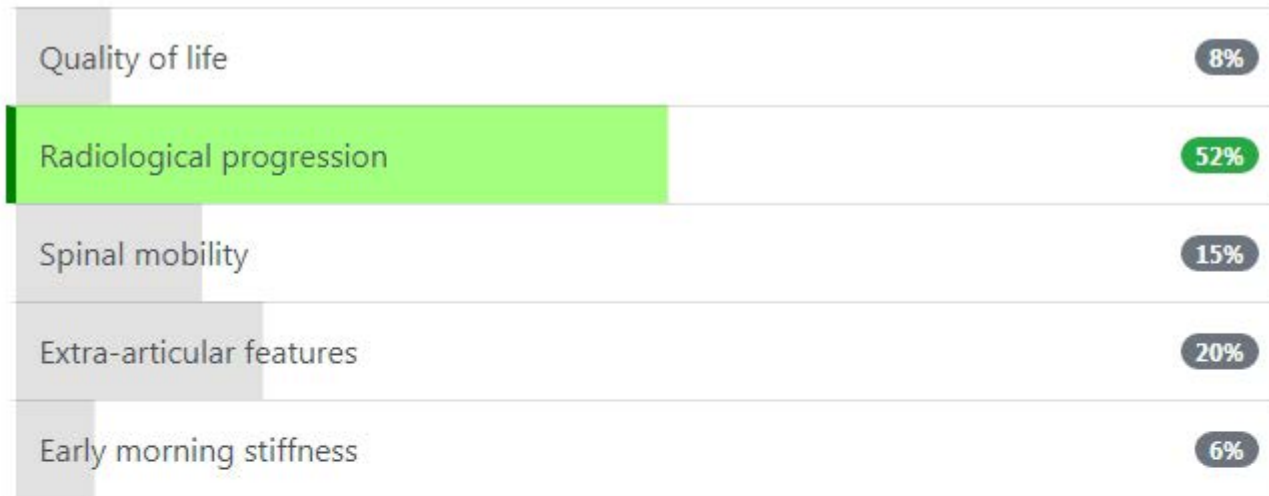
- ☐ Normal
- ☐ Dilated cardiomyopathy
- ☐ Bicuspid aortic valve
- ☐ Atrial septal defect
- ☐ Ventricular septal defect



This is a typical MRCP question. On first sight this question appears to be pointing towards a paradoxical embolus. However, given the history of miscarriages and DVT a diagnosis of antiphospholipid syndrome is more likely.

You are the ST1 working in the rheumatology out-patient clinic. Your next patient is a 25-year-old man who was diagnosed with ankylosing spondylitis (AS) 12 months ago. Despite regular physiotherapy and trials of two different non-steroidal anti-inflammatory drugs (NSAIDs) he remains symptomatic and asks you about the potential benefits of TNF-inhibitor therapy. You should tell him that TNF-inhibitors will improve all of the following except:

- ☐ Quality of life
- ☐ Radiological progression
- ☐ Spinal mobility
- ☐ Extra-articular features
- ☐ Early morning stiffness



Radiographic damage in AS is quantified by the number of syndesmophytes, squaring, erosions and sclerosis developing at vertebral corners. Quantified radiographic damage has been shown to correlate well with spinal mobility and overall physical function. However, unlike rheumatoid arthritis and psoriatic arthritis, where TNF-inhibitors have demonstrated significant effect on progression of structural damage, the evidence to date is that the radiographic progression of AS is unaltered with the use of these agents. The only therapy showing promise for a disease modifying effect in this regard so far has been sustained use of NSAIDs.

A 56-year-old lady is referred to rheumatology clinic due to severe Raynaud's phenomenon associated with arthralgia of the fingers. On examination you note shiny and tight skin of the fingers with a number of telangiectasia on the upper torso and face. She is also currently awaiting a gastroscopy to investigate heartburn. Which one of the following antibodies is most specific for the underlying condition?

- ☐ Anti-Jo 1 antibodies
- ☐ Rheumatoid factor
- ☐ Anti-Scl-70 antibodies
- ☐ Anti-centromere antibodies
- ☐ Anti-nuclear factor

Anti-Jo 1 antibodies

7%

Rheumatoid factor

4%

Anti-Scl-70 antibodies

31%

Anti-centromere antibodies

53%

Anti-nuclear factor

6%

Limited (**central**) systemic sclerosis = anti-**centromere** antibodies

Important for me Less important

This lady has some features of CREST syndrome. Although ANA is positive in 90% of patients with systemic sclerosis, anti-centromere antibodies are the most specific test for limited cutaneous systemic sclerosis

A 65-year-old man with a history of type 2 diabetes mellitus and peripheral arterial disease is investigated for fatigue and pyrexia of unknown origin. He recently had an amputation of a toe on his left foot. A diagnosis of osteomyelitis is suspected in the left foot. What is the most appropriate investigation?

- ☐ MRI
- ☐ Plain x-ray
- ☐ Positron emission tomographic (PET) scan
- ☐ Bone biopsy
- ☐ CT scan

MRI

72%

Plain x-ray

13%

Positron emission tomographic (PET) scan

4%

Bone biopsy

6%

CT scan

6%

Osteomyelitis: MRI is the imaging modality of choice

Important for me

Less important

Which of the following is associated with a good prognosis in rheumatoid arthritis?

- ☐ Rheumatoid factor negative
- ☐ HLA DR4
- ☐ Anti-CCP antibodies
- ☐ Rheumatoid nodules
- ☐ Insidious onset

Rheumatoid factor negative

61%

HLA DR4

10%

Anti-CCP antibodies

10%

Rheumatoid nodules

7%

Insidious onset

13%

Osteopetrosis is due to a defect in:

- ☐ Osteoclast function
- ☐ PTH receptors
- ☐ Osteoblast function
- ☐ Calcium resorption in proximal tubule
- ☐ Calcium absorption

Osteoclast function

55%

PTH receptors

5%

Osteoblast function

26%

Calcium resorption in proximal tubule

8%

Calcium absorption

6%

Dr. Arsem

A 50-year-old female with a history of rheumatoid presents with a suspected septic knee joint. A diagnostic aspiration is performed and sent to microbiology. Which of the following organisms is most likely to be responsible?

- ☐ *Staphylococcus aureus*
- ☐ *Staphylococcus epidermidis*
- ☐ *Escherichia coli*
- ☐ *Neisseria gonorrhoeae*
- ☐ *Streptococcus pneumoniae*

Staphylococcus aureus

80%

Staphylococcus epidermidis

9%

Escherichia coli

4%

Neisseria gonorrhoeae

4%

Streptococcus pneumoniae

3%

Septic arthritis - most common organism: *Staphylococcus aureus*

Important for me

Less important

A 63-year-old man presents to the Emergency Department with a 2 day history of a painful and swollen left knee joint. Aspiration reveals positively birefringent crystals and no organisms are seen. Which of the following conditions are not recognised causes of the underlying condition?

- ☐ Haemochromatosis
- ☐ Low magnesium
- ☐ High phosphate
- ☐ Acromegaly
- ☐ Hyperparathyroidism

Haemochromatosis

14%

Low magnesium

20%

High phosphate

44%

Acromegaly

12%

Hyperparathyroidism

10%

A low phosphate predisposes to pseudogout

Which one of the following is not associated with carpal tunnel syndrome?

- ☐ Tinel's sign
- ☐ Compression of the median nerve
- ☐ Wasting of the hypothenar eminence
- ☐ Flexion of the wrist reproduces symptoms
- ☐ Weakness of thumb abduction

Tinel's sign

4%

Compression of the median nerve

3%

Wasting of the hypothenar eminence

69%

Flexion of the wrist reproduces symptoms

10%

Weakness of thumb abduction

14%

A 45-year-old woman with a history of primary Sjogren's syndrome is reviewed in clinic. Her main problem is a dry mouth, which unfortunately has not responded to artificial saliva. Which one of the following medications is most likely to be beneficial?

☐ Rivastigmine

☐ Neostigmine

☐ Clonidine

☐ Atropine

☐ Pilocarpine

Rivastigmine

8%

Neostigmine

10%

Clonidine

6%

Atropine

7%

Pilocarpine

69%

Which one of the following best describes rheumatoid factor?

- ☐ IgG against the Fc portion of IgM
- ☐ IgM against the Fc portion of IgA
- ☐ IgM against the Fc portion of IgM
- ☐ IgM against the Fc portion of IgG
- ☐ IgG against the Fc portion of IgA

IgG against the Fc portion of IgM

24%

IgM against the Fc portion of IgA

6%

IgM against the Fc portion of IgM

5%

IgM against the Fc portion of IgG

58%

IgG against the Fc portion of IgA

7%

Rheumatoid factor is an IgM antibody against IgG

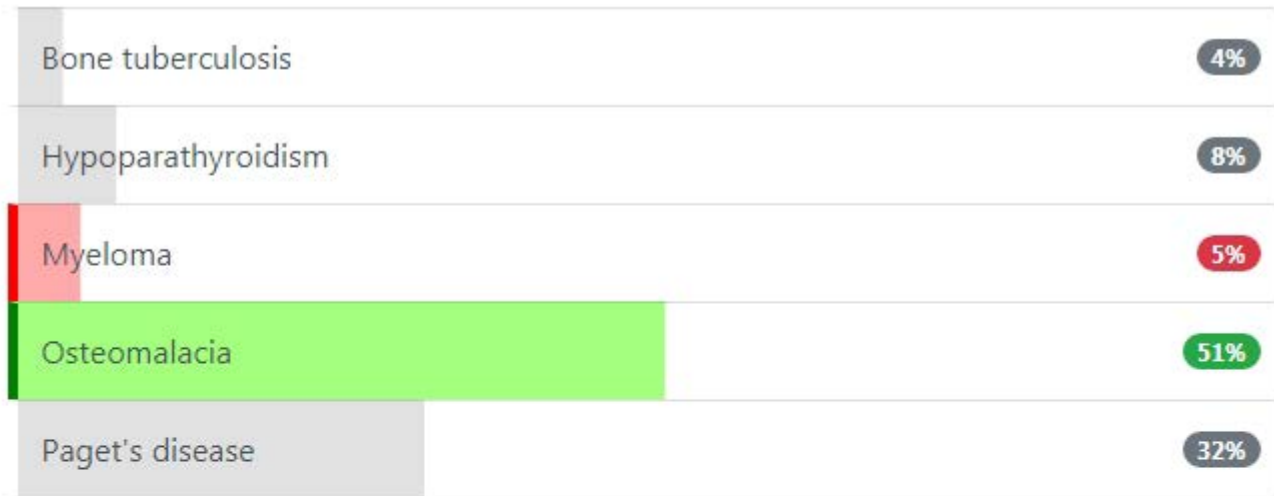
Important for me Less important

A 65-year-old Asian female presents with generalised bone pain and muscle weakness. Investigations show:

Calcium	2.07 mmol/l
Phosphate	0.66 mmol/l
ALP	256 U/l

What is the most likely diagnosis?

- ☐ Bone tuberculosis
- ☐ Hypoparathyroidism
- ☐ Myeloma
- ☐ Osteomalacia
- ☐ Paget's disease



Osteomalacia

- low: calcium, phosphate
- raised: alkaline phosphatase

Important for me Less important

The low calcium and phosphate combined with the raised alkaline phosphatase point towards osteomalacia

A 19-year-old man presents with a spontaneous pneumothorax. He is noted to be of slim build with a tall stature and a high arched palate. His family who attends the hospital with him have a similar appearance. You suspect Marfan's syndrome.

This disease is caused by a mutation in the gene that encodes which protein?

- ☐ Collagen
- ☐ Elastin
- ☐ Fibrillin-1
- ☐ Tropoelastin
- ☐ Actin

Collagen	9%
Elastin	9%
Fibrillin-1	76%
Tropoelastin	4%
Actin	3%

Marfan's syndrome is caused by a mutation in a protein called fibrillin-1

Important for me Less important

Mutation of FBN1 that encodes Fibrillin-1 is responsible for Marfan's syndrome.

See Online Mendelian Inheritance In Man website for further detail:

<https://www.omim.org/entry/134797>

Dr Assem

A 36-year-old female presents with her second unprovoked pulmonary embolus 3 months after ceasing warfarin after her first pulmonary embolus. She has a series of tests done to evaluate for the presence of thrombophilia, in particular anti-phospholipid syndrome. What is the greatest predictor of future thrombosis in patients with anti-phospholipid syndrome?

- ☐ Lupus anticoagulant
- ☐ Anticardiolipin antibody
- ☐ Beta-2-glycoprotein-1 antibody
- ☐ Anti-prothrombin antibody
- ☐ Annexin antibody

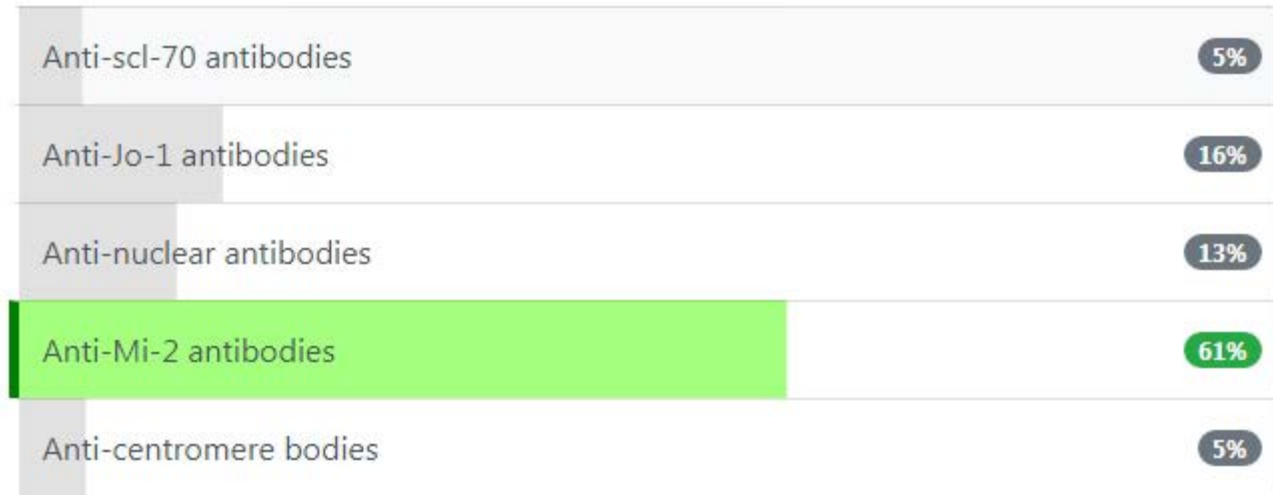
A 36-year-old female presents with her second unprovoked pulmonary embolus 3 months after ceasing warfarin after her first pulmonary embolus. She has a series of tests done to evaluate for the presence of thrombophilia, in particular anti-phospholipid syndrome. What is the greatest predictor of future thrombosis in patients with anti-phospholipid syndrome?

Lupus anticoagulant	45%
Anticardiolipin antibody	35%
Beta-2-glycoprotein-1 antibody	10%
Anti-prothrombin antibody	7%
Annexin antibody	2%

Lupus anticoagulant is the strongest risk factor for thrombosis of all the listed options. Lupus anticoagulants have an odds ratio for thrombosis 5 to 16 times higher than controls. Anticardiolipin antibodies, beta-2-glycoprotein 1 antibodies and the other options listed, are not considered as prothrombotic as lupus anticoagulant.

A 61-year-old man is noted to have thickened patches of skin over his knuckles and extensor surfaces consistent with Gottron's papules. His creatinine kinase levels are also elevated. A diagnosis of dermatomyositis is suspected. Which one of the following types of autoantibody is most specific for this condition?

- ☐ Anti-scl-70 antibodies
- ☐ Anti-Jo-1 antibodies
- ☐ Anti-nuclear antibodies
- ☐ Anti-Mi-2 antibodies
- ☐ Anti-centromere bodies



Dermatomyositis antibodies: ANA most common, anti-Mi-2 most specific

Important for me Less important

Reactive arthritis is associated with which one of the following HLA antigens?

☐ HLA-B27

☐ HLA-A3

☐ HLA-DR4

☐ HLA-B5

☐ HLA-DR3

HLA-B27

72%

HLA-A3

3%

HLA-DR4

11%

HLA-B5

5%

HLA-DR3

9%

A 30-year-old man with a history of mitral valve prolapse, recurrent pneumothorax, lower back pain secondary to scoliosis and pectus excavatum is considering starting a family. Given the likely diagnosis, what is the mode of inheritance of this condition?

- ☐ X-linked recessive
- ☐ Mitochondrial
- ☐ Autosomal codominant
- ☐ Autosomal recessive
- ☐ Autosomal dominant

X-linked recessive

9%

Mitochondrial

4%

Autosomal codominant

9%

Autosomal recessive

15%

Autosomal dominant

63%

A 30-year-old woman presents with bilateral proximal muscle weakness. She is noted to have blanching of the fingers, especially in cold weather.

Anti-Jo-1	positive
ANA	positive
CK	2000 U/L
ESR	60 mm/hr
EMG	myopathic changes

The presence of which of the following conveys the worst prognosis?

- ☐ Dysphagia
- ☐ Skin rash
- ☐ CK > 2000 U/L
- ☐ Interstitial lung disease
- ☐ Raynaud's phenomenon

Dysphagia	16%
Skin rash	5%
CK >2000 U/L	13%
Interstitial lung disease	57%
Raynaud's phenomenon	8%

Polymyositis is a type of inflammatory myopathy related to dermatomyositis and inclusion body myositis. The hallmark of polymyositis is weakness and/or loss of muscle mass in the proximal musculature, and absent skin involvement. The classic laboratory finding is a raised creatinine kinase (CK) and the Anti-Jo-1 antibody.

Interstitial lung disease (ILD) has a major effect on morbidity and mortality in patients with polymyositis. ILD is considered to be a major risk factor for premature death in patients with myositis.

The anti-Jo-1 antibody is a predictor of the presence of ILD at diagnosis, with up to 70% of patients with the antibody having concurrent ILD. The 5-year survival rate is between 60 and 80%.

A 54-year-old man with a history of type 2 diabetes mellitus presents with a history of right shoulder pain. On examination there is limited movement of the right shoulder in all directions. What is the most likely diagnosis?

- ☐ Adhesive capsulitis
- ☐ Dermatomyositis
- ☐ Avascular necrosis
- ☐ Lhermitte's syndrome
- ☐ Diabetic amyotrophy

Adhesive capsulitis

81%

Dermatomyositis

3%

Avascular necrosis

7%

Lhermitte's syndrome

4%

Diabetic amyotrophy

5%

Diabetic amyotrophy affects the lower limbs

Dr Assef

A 17-year-old male presents to General Practice with recurrent cramping in his arms during a rowing training session. On closer questioning, he has noticed a reduction in his exercise tolerance recently. He reports getting a 'second wind' phenomenon after minutes of rest.

On examination, he is well with no apparent deficit.

Bloods reveal:

Hb	142 g/l
Platelets	204 * 10 ⁹ /l
WBC	6.7 * 10 ⁹ /l
Na ⁺	139 mmol/l
K ⁺	4.2 mmol/l
Urea	8.9 mmol/l
Creatinine	148 µmol/l
Adjusted calcium	2.23 mmol/L
Creatine kinase	1037 IU/L
Autoimmune profile	pending

What is the most likely underlying diagnosis?

☒ Polymyositis

☐ Dermatomyositis

☐ Von Gierke's disease

☐ McArdle's disease

☐ Pompe's disease

Polymyositis	25%
Dermatomyositis	8%
Von Gierke's disease	9%
McArdle's disease	51%
Pompe's disease	7%

McArdle's disease is characteristically associated with a 'second-wind' phenomenon and present with distal muscle cramping in this demographic following exercise.

Polymyositis and dermatomyositis would, typically but not always, cause a more marked increase in creatine kinase which can be up to 100 times the upper limit of normal.

Von Gierke patients present with manifestations related to hypoglycemia around three to four months of age. Pompe's disease tends to also present in infants but with cardiomyopathy and severe, generalised muscular hypotonia.

A health trust in the United Kingdom which serves a population of 100,000 is planning services for patients with rheumatoid arthritis. How many of the population would be expected to have the disease?

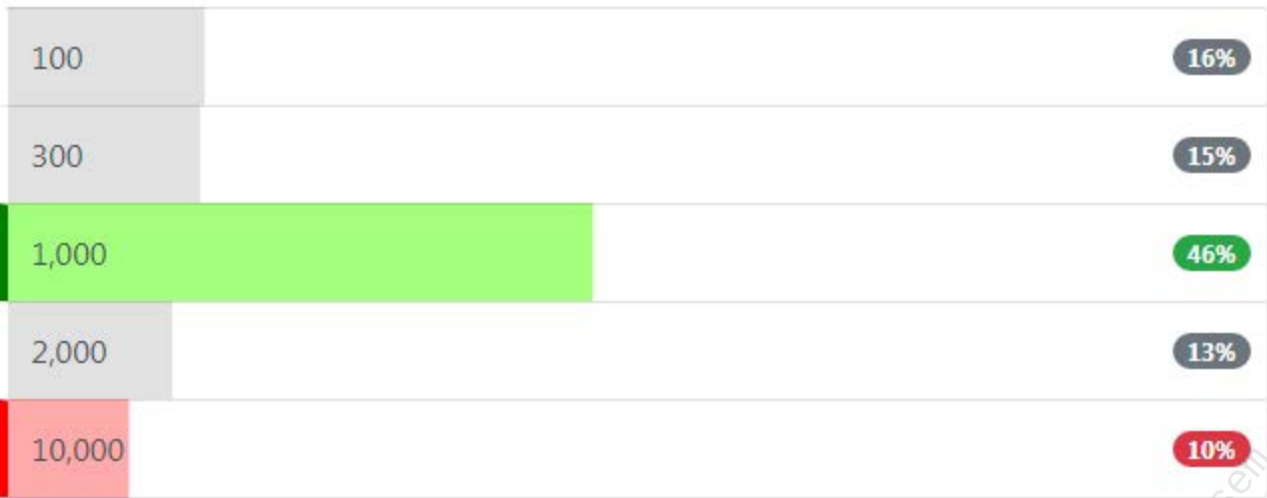
☐ 100

☐ 300

☐ 1,000

☐ 2,000

☐ 10,000



The prevalence of rheumatoid arthritis in the UK population is approximately 1%

Which one of the following drugs is least likely to cause gout?

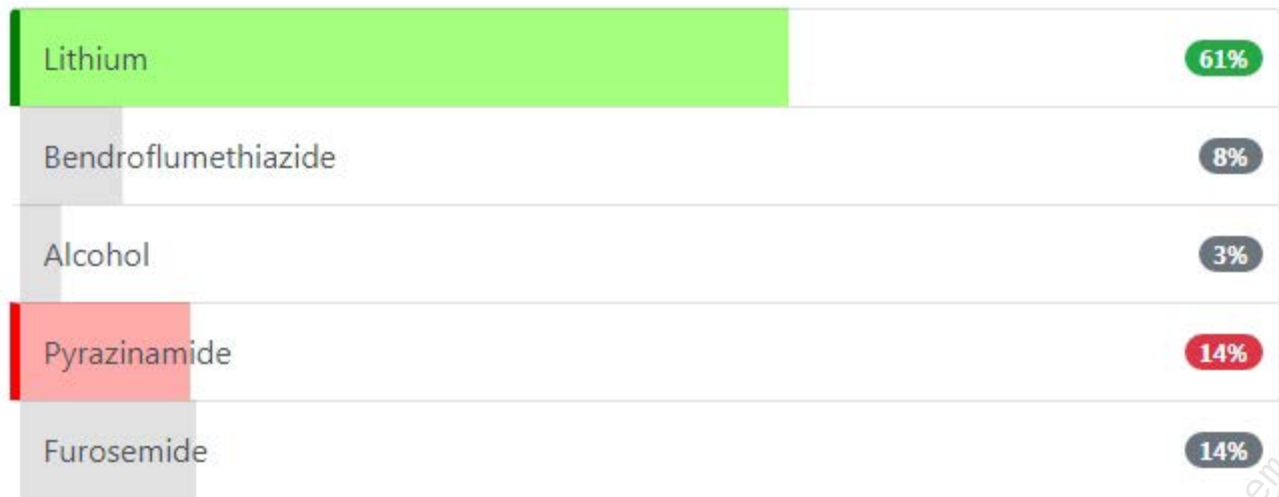
☐ Lithium

☐ Bendroflumethiazide

☐ Alcohol

☐ Pyrazinamide

☐ Furosemide



Lithium was actually used to treat gout in the 19th century

A 34-year-old kitchen worker presents with a two week history of pain in her right wrist. She has recently emigrated from Ghana and has no past medical history of note. On examination she is tender over the base of her right thumb and also over the radial styloid process. Ulnar deviation of the wrist recreates the pain. What is the most likely diagnosis?

- ☐ Rheumatoid arthritis
- ☐ Osteoarthritis of the carpometacarpal joint
- ☐ De Quervain's tenosynovitis
- ☐ Carpal tunnel syndrome
- ☐ Systemic lupus erythematosus

Rheumatoid arthritis

6%

Osteoarthritis of the carpometacarpal joint

11%

De Quervain's tenosynovitis

69%

Carpal tunnel syndrome

10%

Systemic lupus erythematosus

5%

Looser's zones x-ray are most characteristically associated with which one of the following conditions?

☐ Primary hyperparathyroidism

☐ Hypoparathyroidism

☐ Osteomalacia

☐ Paget's disease

☐ Osteoporosis

Primary hyperparathyroidism

9%

Hypoparathyroidism

6%

Osteomalacia

54%

Paget's disease

23%

Osteoporosis

9%

A 25-year-old woman presents with a three day history of dysuria and a painful left knee. During the review of symptoms she mentions a bout of diarrhoea and crampy abdominal pain three weeks ago. She is normally fit and well and takes no regular medication. Her father died of colorectal cancer in his sixth decade. On examination the left knee is red, swollen and hot to touch. What is the most likely diagnosis?

- ☐ Reactive arthritis secondary to *Salmonella* spp.
- ☐ Reactive arthritis secondary to *Chlamydia trachomatis*
- ☐ Rheumatoid arthritis
- ☐ Ulcerative colitis
- ☐ Gonococcal arthritis

Reactive arthritis secondary to

Salmonella

spp.

62%

Reactive arthritis secondary to

Chlamydia trachomatis

20%

Rheumatoid arthritis

2%

Ulcerative colitis

6%

Gonococcal arthritis

9%

Urethritis + arthritis + conjunctivitis = reactive arthritis

Important for me Less important

Two of the classic three features of reactive arthritis (urethritis, arthritis and conjunctivitis) are present in this patient. The family history of colorectal cancer is of no particular significance. Symptoms of reactive arthritis typically appear 1-4 weeks following the initial infection, in this case a diarrhoeal illness.

Which of the following findings is not typical in a patient with antiphospholipid syndrome?

- ☐ Prolonged APTT
- ☐ Thrombocytosis
- ☐ Recurrent venous thrombosis
- ☐ Recurrent arterial thrombosis
- ☐ Livedo reticularis

Prolonged APTT

10%

Thrombocytosis

62%

Recurrent venous thrombosis

4%

Recurrent arterial thrombosis

15%

Livedo reticularis

9%

Antiphospholipid syndrome: arterial/venous thrombosis, miscarriage, livedo reticularis

Important for me Less important

Thrombocytopenia is associated with antiphospholipid syndrome

A 59-year-old man with a history of gout presents with a swollen and painful first metatarsophalangeal joint. He currently takes allopurinol 400mg od as gout prophylaxis. What should happen to his allopurinol therapy?

- ☐ Stop and recommence 4 weeks after acute inflammation has settled
- ☐ Reduce allopurinol to 100mg od until acute attack has settled
- ☐ Stop and switch to colchicine prophylaxis
- ☐ Stop and recommence 2 weeks after acute inflammation has settled
- ☐ Continue allopurinol in current dose

Stop and recommence 4 weeks after acute inflammation has settled

10%

Reduce allopurinol to 100mg od until acute attack has settled

6%

Stop and switch to colchicine prophylaxis

9%

Stop and recommence 2 weeks after acute inflammation has settled

15%

Continue allopurinol in current dose

60%

A 28-year-old woman who has rheumatoid arthritis is to be started on etanercept injections after failing to respond to methotrexate and sulfasalazine. Which one of the following adverse effects is associated with the use of etanercept?

- ☐ Triggering Churg-Strauss syndrome
- ☐ Thrombocytosis
- ☐ Tendonitis
- ☐ Cardiomyopathy
- ☐ Reactivation of tuberculosis

Triggering Churg-Strauss syndrome

4%

Thrombocytosis

5%

Tendonitis

7%

Cardiomyopathy

7%

Reactivation of tuberculosis

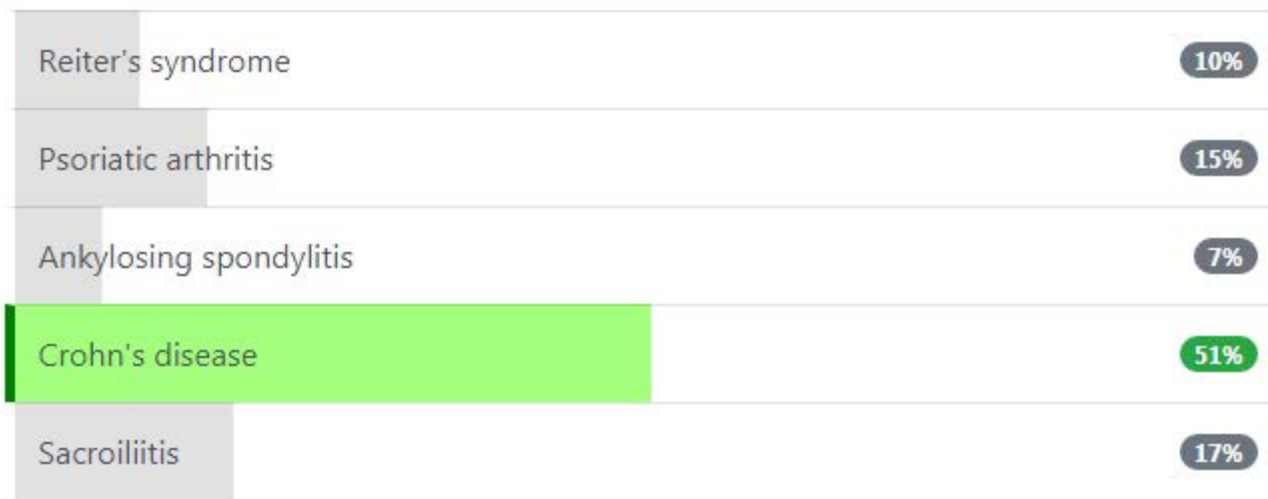
77%

TNF- α inhibitors may reactivate TB

Important for me Less important

Which one of the following conditions is least associated with HLA-B27?

- ☐ Reiter's syndrome
- ☐ Psoriatic arthritis
- ☐ Ankylosing spondylitis
- ☐ Crohn's disease
- ☐ Sacroiliitis



There is an indirect association between HLA-B27 and Crohn's as some patients may develop enteropathic arthritis, but this is the least common association of the above

A 72-year-old woman is reviewed in the osteoporosis clinic. She had a hip fracture 5 years ago after which she was started on alendronate. This had to be stopped due to persistent musculoskeletal pain. Risedronate also had to be stopped for similar reasons. Strontium ranelate was therefore started but this was stopped following the development of a deep vein thrombosis. Her current T-score is -4.1. It has therefore been decided to start a trial of denosumab. What is the mechanism of action of this drug?

- ☐ Monoclonal antibody against osteoprotegerin
- ☐ Selective oestrogen receptor modulator
- ☐ Inhibits RANK ligand, which in turn inhibits the maturation of osteoclasts
- ☐ Promotes differentiation of pre-osteoblasts to osteoblasts + inhibits osteoclasts
- ☐ Pyrophosphate analog which inhibits osteoclast activity

Monoclonal antibody against osteoprotegerin

23%

Selective oestrogen receptor modulator

6%

Inhibits RANK ligand, which in turn inhibits the maturation of osteoclasts

56%

Promotes differentiation of pre-osteoblasts to osteoblasts + inhibits osteoclasts

9%

Pyrophosphate analog which inhibits osteoclast activity

5%

One of your patients who has a family history of Marfan's syndrome has recently been diagnosed with the condition. What is the most important investigation to monitor their condition?

- ☐ Urea and electrolytes
- ☐ Echocardiography
- ☐ Spirometry
- ☐ Electrocardiogram
- ☐ DEXA scan

Urea and electrolytes

3%

Echocardiography

80%

Spirometry

5%

Electrocardiogram

8%

DEXA scan

4%

Marfan's syndrome is associated with dilation of the aortic sinuses which may predispose to aortic dissection

Important for me Less important

Potential complications of Paget's disease include each of the following except:

- ☐ Deafness
- ☐ Cerebral calcification
- ☐ Skull thickening
- ☐ Bone sarcoma
- ☐ Fractures

Deafness

8%

Cerebral calcification

62%

Skull thickening

8%

Bone sarcoma

15%

Fractures

8%

A 24-year-old nulliparous female with a history of recurrent deep vein thrombosis presents with shortness of breath. The full blood count and clotting screen reveals the following results:

Hb	12.4 g/dl
Plt	137
WBC	$7.5 \times 10^9/l$
PT	14 secs
APTT	46 secs

What is the most likely underlying diagnosis?

- ☐ Third generation oral contraceptive pill use
- ☐ Protein C deficiency
- ☐ Antithrombin III deficiency
- ☐ Antiphospholipid syndrome
- ☐ Activated protein C resistance

Third generation oral contraceptive pill use

5%

Protein C deficiency

6%

Antithrombin III deficiency

9%

Antiphospholipid syndrome

71%

Activated protein C resistance

8%

Antiphospholipid syndrome: (paradoxically) prolonged APTT + low platelets

Important for me Less important

The combination of a prolonged APTT and thrombocytopenia make antiphospholipid syndrome the most likely diagnosis

A 47-year-old female presents with elbow pain. She has just spent the weekend painting the house. On examination there is localised pain around the lateral epicondyle and a diagnosis of lateral epicondylitis is suspected. Which one of the following movements would characteristically worsen the pain?

- ☐ Resisted thumb flexion
- ☐ Thumb extension
- ☐ Flexion of the elbow
- ☐ Pronation of the forearm with the elbow flexed
- ☐ Resisted wrist extension with the elbow extended

Resisted thumb flexion

3%

Thumb extension

3%

Flexion of the elbow

4%

Pronation of the forearm with the elbow flexed

25%

Resisted wrist extension with the elbow extended

65%

Lateral epicondylitis: worse on resisted wrist extension/supination whilst elbow extended

Important for me Less important

A 75-year-old male presents to the Emergency Department with a month-long history of right-sided hearing loss and left-sided bony hip pain. Blood results show:

ALP	440 IU/l
Calcium	2.20 mmol/l
Phosphate	1.05 mmol/l
Total Protein	65 g/l

Other results are unremarkable. What is the most appropriate initial management step in the treatment of this condition?

- ☐ Risedronate
- ☐ Teriparatide
- ☐ Prednisolone
- ☐ Vitamin D
- ☐ Calcitonin

Risedronate	57%
Teriparatide	7%
Prednisolone	14%
Vitamin D	15%
Calcitonin	8%

Paget's disease of the bone is treated with bisphosphonates

Important for me Less important

This question requires you first of all to diagnose the condition and then identify the correct management.

The constellation of bony pain, unilateral hearing loss, and an isolated raised ALP should point you in the direction of Paget's disease of the bone. In symptomatic Paget's disease, treatment is with a nitrogen-containing bisphosphonate such as alendronate, risedronate, or zoledronic acid. In patients who cannot tolerate these, calcitonin is second-line therapy.

Unless contraindicated, all patients on bisphosphonates should be given supplements of calcium and Vitamin D to avoid symptomatic hypocalcaemia.

There is no role for prednisolone in the treatment of Paget's disease of the bone.

Teriparatide is a recombinant form of human parathyroid hormone (PTH) that may be used in the treatment of osteoporosis.

Dr Assem

A 66-year-old female with COPD and a background of multiple previous courses of steroids presents to her GP for a routine bloods screen. She also has hypertension and angina. Her blood results are as follows:

25-OH Vitamin D	16 nmol/l (>50)
Adjusted calcium	2.34 mmol/l

Her dietary intake of calcium is good. Which answer is most appropriate in view of her past medical history and vitamin D levels?

- ☐ Give calcium and vitamin D combined
- ☐ Reassurance
- ☐ Repeat in 1 year and if vitamin D <10 commence treatment
- ☐ Commence oral bisphosphonate
- ☐ Oral vitamin D loading then maintenance

Give calcium and vitamin D combined	19%
Reassurance	5%
Repeat in 1 year and if vitamin D <10 commence treatment	4%
Commence oral bisphosphonate	15%
Oral vitamin D loading then maintenance	56%

This patient has vitamin D deficiency and thus the correct answer is to load with vitamin D and then continue on maintenance. In patients with good calcium intake and normal serum calcium, giving oral calcium may actually be detrimental. This is due to evidence suggesting adverse cardiovascular outcomes, which is thought to be related to accelerated tissue and vascular calcification. Thus given her background of angina, this should be avoided.

Measurement of serum 25-OH vitamin D is the best way of estimating vitamin D status.

Optimal: > 75nmol/l	
Adequate: 50-75nmol/l	
Insufficiency: 30-49nmol/l	
Deficiency: < 30nmol/l	

- Serum 25OHD < 30 nmol/l: treatment recommended
- Serum 25OHD 30-50 nmol/l: treatment is advised in patients with: fragility fracture, osteoporosis, symptoms suggestive of vitamin D deficiency, reduced exposure to sunlight, raised PTH, conditions associated with malabsorption
- Serum 25OHD > 50 nmol/l: provide reassurance and give advice on maintaining adequate vitamin D levels through safe sunlight exposure and diet

Reference:

1. National Osteoporosis Society (2013). Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management

A 58-year-old man presents with a 3-day history of painful swelling of the 1st metatarsophalangeal joint of his right foot. He has a history of hypertension, hypercholesterolaemia and osteoarthritis. His list of medications includes amlodipine, ibuprofen, omeprazole, indapamide and atorvastatin.

Which of his list of medications is most likely to have precipitated his acute attack of gout?

- ☐ Amlodipine
- ☐ Ibuprofen
- ☐ Omeprazole
- ☐ Indapamide
- ☐ Atorvastatin

Amlodipine

7%

Ibuprofen

8%

Omeprazole

5%

Indapamide

75%

Atorvastatin

5%

Thiazide diuretics can precipitate an attack of gout

Important for me Less important

Thiazide diuretics, such as indapamide, chlortalidone and bendroflumethiazide, can precipitate an acute attack of gout by reducing renal excretion of uric acid. The other drugs are less associated.

Dr Assem

A 23-year-old female presents with a painful ankle following an inversion injury whilst playing tennis. Which one of the following findings is least relevant when deciding whether an x-ray is needed?

- ☐ Swelling immediately after the injury and now
- ☐ Pain in the malleolar zone
- ☐ Tenderness at the medial malleolar zone
- ☐ Tenderness at the lateral malleolar zone
- ☐ Cannot walk 4 steps immediately after the injury and now

Swelling immediately after the injury and now

45%

Pain in the malleolar zone

16%

Tenderness at the medial malleolar zone

11%

Tenderness at the lateral malleolar zone

11%

Cannot walk 4 steps immediately after the injury and now

17%

Cristiano, 36-year-old gentleman presents to the emergency department complaining of a painful, swollen knee. On examination, he is limping and unable to fully extend or flex his knee. He has a tense effusion in his knee, which is warm to touch and swollen. His eyes also appear red and irritated. He reports dysuria and tells you that he was diagnosed and treated for an STI three weeks ago. The patient records show that Cristiano has previously tested HLA-B27 positive and has presented several times in the past with similar symptoms. You perform arthrocentesis. Which one of the following sets of characteristics would you expect the synovial fluid to show?

- Cloudy yellow colour, Culture negative, Calcium pyrophosphate crystals, White cell count: $15,000/\text{mm}^3$
- Turbid grey colour, Weakly gram-negative ovoid shaped bacteria, No crystals, White cell count: $90,000/\text{mm}^3$
- Turbid grey colour, Gram-negative diplococci, No crystals, White cell count: $90,000/\text{mm}^3$
- Cloudy yellow colour, Culture negative, No crystals, White cell count: $20,000/\text{mm}^3$
- Cloudy yellow colour, Culture negative, Urate crystals, White cell count: $20,000/\text{mm}^3$

Turbid grey colour, Weakly gram-negative ovoid shaped bacteria, No crystals, White cell count: 90,000/mm

3 8%

Turbid grey colour, Gram-negative diplococci, No crystals, White cell count: 90,000/mm

3 29%

Cloudy yellow colour, Culture negative, No crystals, White cell count: 20,000/mm

3 48%

Cloudy yellow colour, Culture negative, Urate crystals, White cell count: 20,000/mm

3 6%

Reactive arthritis: develops after an infection where the organism cannot be recovered from the joint

Important for me Less important

This gentleman is suffering from reactive arthritis and has presented with a typical triad of urethritis, conjunctivitis and arthritis. Patients who are HLA-B27 positive are predisposed to recurrences of reactive arthritis and hence should be advised to take particular care to avoid infections (e.g. *Chlamydia*) which cause these recurrences.

Reactive arthritis usually occurs several weeks after an infection, and the organism **cannot** be recovered from the joint on arthrocentesis. The turbid-grey-coloured joint aspirates with organisms detected on culture indicate a septic joint and are hence incorrect. Additionally, as reactive arthritis is not a crystal-arthritis, crystals will not be found in the joint aspirate making the other two options incorrect.

A 35-year-old woman who has severe Raynaud's disease is reviewed in clinic. Three months ago she was started on nifedipine. Unfortunately this has had a minimal effect on her symptoms and has resulted in ankle oedema. What is the most appropriate next step in management?

- ☐ Aspirin
- ☐ Sympathectomy
- ☐ Intravenous prostacyclin
- ☐ Methotrexate
- ☐ Intravenous infliximab

Aspirin

15%

Sympathectomy

13%

Intravenous prostacyclin

52%

Methotrexate

13%

Intravenous infliximab

7%

Epoprostenol (amongst other prostaglandins) can be used in the treatment of Raynaud's phenomenon

Important for me Less important

Which one of the following is least recognised in polyarteritis nodosa?

- ☐ Cytoplasmic-antineutrophil cytoplasmic antibodies
- ☐ Hypertension
- ☐ Mononeuritis multiplex
- ☐ Pyrexia
- ☐ Renal failure

Cytoplasmic-antineutrophil cytoplasmic antibodies

52%

Hypertension

12%

Mononeuritis multiplex

13%

Pyrexia

15%

Renal failure

9%

Perinuclear-antineutrophil cytoplasmic antibodies are found in around 20% of patients

A 62-year-old man is reviewed on the acute medical ward with a two week history of lumbar back pain and fevers. He complains of point tenderness over the L1-2 area and finds it difficult to mobilise.

You arrange for an MRI of his lumbar spine which is reported as follows:

'Area of hyperintensity visible at the L1-2 disc space with vertebral end plate changes suggestive of vertebral osteomyelitis/discitis.'

Which of the following organisms is most likely to be responsible?

- ☐ *Streptococcus pyogenes*
- ☐ *Salmonella enterica*
- ☐ *Staphylococcus aureus*
- ☐ *Escherichia coli*
- ☐ *Pseudomonas aeruginosa*



Staphylococcus aureus is the most common cause of osteomyelitis

Important for me Less important

In the majority of cases, osteomyelitis and discitis is caused by *Staphylococcus aureus*.

In patients with sickle cell anaemia and other haemoglobinopathies, *Salmonella sp.* become more common however it is usually preceded by a period of gastrointestinal upset.

The other organisms are all capable of causing osteomyelitis and discitis however disease caused by these organisms occurs much less commonly than that caused by *Staphylococcus aureus*.

A 57-year-old woman with a history of polymyalgia rheumatica has been taking prednisolone 10 mg for the past 5 months. A DEXA scan is reported as follows:

L2 T-score	-1.6 SD
Femoral neck T-score	-1.7 SD

What is the most suitable management?

- ☐ No treatment
- ☐ Vitamin D + calcium supplementation + repeat DEXA scan in 6 months
- ☐ Vitamin D + calcium supplementation
- ☐ Vitamin D + calcium supplementation + hormone replacement therapy
- ☐ Vitamin D + calcium supplementation + oral bisphosphonate

No treatment	15%
Vitamin D + calcium supplementation + repeat DEXA scan in 6 months	20%
Vitamin D + calcium supplementation	18%
Vitamin D + calcium supplementation + hormone replacement therapy	10%
Vitamin D + calcium supplementation + oral bisphosphonate	37%

This patient has been taking 10mg of prednisolone for the past 5 months and hence should be assessed for bone protection. The T score of less than -1.5 SD is an indication for a bisphosphonate. This should be co-prescribed with calcium + vitamin D.

Which one of the following is least recognised as a risk factor for developing osteoporosis?

- ☐ Cushing's syndrome
- ☐ Turner's syndrome
- ☐ Hyperparathyroidism
- ☐ Hypothyroidism
- ☐ Diabetes mellitus

Cushing's syndrome

7%

Turner's syndrome

21%

Hyperparathyroidism

13%

Hypothyroidism

37%

Diabetes mellitus

22%

Hyperthyroidism is associated with an increased risk of osteoporosis. Patients with hypothyroidism who take excessive amounts of levothyroxine may also be at risk of osteoporosis

A 60-year-old man with a past medical history of osteoarthritis presents with a swollen, red and hot left knee joint. He is unable to move it due to the pain. On examination he is pyrexial with a temperature of 38.7 C and a blood sample shows a white cell count of $22.8 \times 10^9/l$. Following joint aspiration, what is the most appropriate antibiotic therapy?

- ☐ IV flucloxacillin + benzylpenicillin
- ☐ IV gentamicin + benzylpenicillin
- ☐ IV flucloxacillin
- ☐ IV vancomycin + cefotaxime
- ☐ IV gentamicin + rifampicin + benzylpenicillin

IV flucloxacillin + benzylpenicillin

20%

IV gentamicin + benzylpenicillin

11%

IV flucloxacillin

55%

IV vancomycin + cefotaxime

9%

IV gentamicin + rifampicin + benzylpenicillin

6%

Septic arthritis: IV flucloxacillin

Important for me Less important

A 41-year-old man presents with persistent fatigue for the past 8 months. Which one of the following features is least consistent with a diagnosis of chronic fatigue syndrome?

- ☐ Dizziness
- ☐ Painful lymph nodes without enlargement
- ☐ Having a busy day improves the symptoms
- ☐ Palpitations
- ☐ Headaches

Dizziness

5%

Painful lymph nodes without enlargement

21%

Having a busy day improves the symptoms

61%

Palpitations

9%

Headaches

4%

Physical or mental exertion usually makes the symptoms worse

A 73-year-old man presents pain in his right thigh. This has been getting progressively worse for the past 9 months despite being otherwise well. An x-ray is reported as follows:

X-ray right femur	Radiolucency of subarticular region suggestive of osteolysis. Some areas of patchy sclerosis
-------------------	--

Bloods tests show:

Calcium	2.38 mmol/l
Phosphate	0.85 mmol/l
Alkaline phosphatase	544 u/L
Prostate specific antigen	4.4 ng/ml

What is the most appropriate action?

- ☐ Vitamin D supplementation
- ☐ Check serum testosterone
- ☐ Referral to an orthopaedic surgeon
- ☐ Referral to a urologist
- ☐ IV bisphosphonates



Paget's disease of the bone is treated with bisphosphonates

Important for me Less important

This patient has Paget's disease as evidenced by an isolated rise in ALP and characteristic x-ray changes. As he has bone pain he should be treated with bisphosphonates. A PSA of 4.4 ng/ml is probably normal in a 73-year-old man and is certainly not consistent with metastatic prostate cancer.

A 45-year-old man who is known to have Marfan's syndrome presents with lower back pain. This has been present for a few months now and is associated with headaches, leg pain and intermittent episodes of urinary incontinence. What is the most likely diagnosis?

- ☐ Depression
- ☐ Spinal stenosis
- ☐ Leaking aortic abdominal aneurysm
- ☐ Multiple sclerosis
- ☐ Dural ectasia

Depression

4%

Spinal stenosis

28%

Leaking aortic abdominal aneurysm

14%

Multiple sclerosis

6%

Dural ectasia

48%

Marfan's syndrome - dural ectasia

Important for me Less important

Dural ectasia affects around 60% of patients with Marfan's syndrome. It may cause lower back pain associated with neurological problems such as bladder and bowel dysfunction.

A 66-year-old female presents with pain at the base of her left thumb. She has no past medical history of note. On examination there is diffuse tenderness and swelling of her left first carpometacarpal joint. What is the most likely diagnosis?

- ☐ Osteoarthritis
- ☐ De Quervain's tenosynovitis
- ☐ Gout
- ☐ Rheumatoid arthritis
- ☐ Primary hyperparathyroidism

Osteoarthritis	34%
De Quervain's tenosynovitis	39%
Gout	18%
Rheumatoid arthritis	6%
Primary hyperparathyroidism	3%

The trapeziometacarpal joint (base of thumb) is the most common site of hand osteoarthritis.

A 32-year-old gentleman is admitted with pain in his legs. On closer questioning, he has difficulty getting out of the chair and he has fallen several times in doing so. His past medical history includes Raynaud's which is controlled with nifedipine. On examination, you notice skin changes consistent with mechanic hands. What is the most likely underlying diagnosis?

- ☐ Myasthenia gravis
- ☐ Lambert-Eaton Myasthenic syndrome
- ☐ McArdle disease
- ☐ Anti-synthetase syndrome
- ☐ Drug-induced myopathy

Myasthenia gravis

6%

Lambert-Eaton Myasthenic syndrome

15%

McArdle disease

27%

Anti-synthetase syndrome

40%

Drug-induced myopathy

12%

The key to this diagnosis is the proximal myopathy in combination with mechanic hands, which are associated with anti-synthetase syndrome. It is important to ask about lung symptoms because there is an association with interstitial lung disease - particularly non-specific interstitial pneumonia or NSIP.

McArdle disease (or myophosphorylase deficiency) is associated with cramping and fatigued muscles following exercise.

Myasthenia gravis causes fatigability and is not associated with mechanic hands.

A 27-year-old man was brought to the hospital after he complained of a sudden-onset chest pain while playing football. He said that this is the first time he is having such a pain. He remembers that one of his uncles had a similar pain when he was young and he died early due to a heart problem. On examination, he has a pulse rate of 87 beats per minute, a respiratory rate of 22 breaths per minute and blood pressure of 101/74 mmHg. The doctor also notices that his fingers are longer than normal and that his little finger and thumb overlapped each when the man was asked to hold the opposite wrist. He has no significant past medical and surgical history and is not currently taking any regular medications. He denies any illicit drug use but smokes about half a pack of cigarette a day since he was 17 years old. Which of the following best explains disease mechanism in this man?

- ☐ Decrease in the production of collagen
- ☐ Impaired hydroxylation of lysine and proline amino acids on collagen
- ☐ A defect of the glycoprotein structure which usually wraps around elastin
- ☐ Copper deficiency affecting the normal function of lysyl oxidase enzyme
- ☐ Overactive elastase enzyme leading to an excessive breakdown of collagen

Decrease in the production of collagen	16%
Impaired hydroxylation of lysine and proline amino acids on collagen	25%
A defect of the glycoprotein structure which usually wraps around elastin	41%
Copper deficiency affecting the normal function of lysyl oxidase enzyme	4%
Overactive elastase enzyme leading to an excessive breakdown of collagen	14%

This young man presented with the sign and symptoms of an aortic dissection. Aortic dissection occurs when there is a tear in the inner wall of the aorta, the intima, leading to an accumulation of blood within the wall of the blood vessel (false lumen as opposed to the true lumen of the aorta). This can occur due to high stress on the aortic wall (chronic uncontrolled hypertension) or a weakening of the aortic wall. This man does not have a history of hypertension but he has signs of a genetically inherited condition strongly associated with aortic dissection. He also has an uncle who died young of a heart complication which could be an aortic dissection due to Marfan syndrome. This condition is known as Marfan syndrome and is inherited in an autosomal dominant pattern.

1: This occurs due to normal aging and is responsible for the appearance of wrinkles and the decreased elasticity of the skin in the elderly population.

2: This is the mechanism via which vitamin C deficiency leads to scurvy.

3: In Marfan syndrome, there is a defection of the glycoprotein fibrillin which normally envelopes elastin and as a result individuals with the condition has a range of signs symptoms such as joint hypermobility, chest deformities and long toes and finger amongst others.

4: This is usually seen in a genetically inherited condition called Menkes disease. The condition is inherited in an X-linked recessive pattern and involves an accumulation of copper in some body tissues.

5: This is characteristic of alpha-1-antitrypsin deficiency whereby there is a deficiency of the enzyme alpha-1-antitrypsin which normally functions to inhibit elastase. The excessive degradation of collagen leads to pan-acinar emphysema and liver impairment.

Stephen is a 57-year-old man who has late ankylosing spondylitis. What pulmonary feature might you see on his chest radiograph?

- ☐ Apical fibrosis
- ☐ Bilateral hilar lymphadenopathy
- ☐ Peripheral granulomas
- ☐ Basal fibrosis
- ☐ Increased pulmonary vasculature markings

Apical fibrosis

82%

Bilateral hilar lymphadenopathy

4%

Peripheral granulomas

3%

Basal fibrosis

7%

Increased pulmonary vasculature markings

4%

May be able to see apical fibrosis on chest x-ray in later ankylosing spondylitis

Important for me Less important

You may be able to see apical fibrosis on chest x-ray in later ankylosing spondylitis.

Peripheral granulomas form after inflammation. Causes include infection, TB and sarcoidosis.

Bilateral hilar lymphadenopathy is often related to sarcoidosis and possibly lymphoma.

Increased pulmonary vasculature markings can be related to congestion or pulmonary hypertension.

Dr Assem

A 67-year-old woman who is taking long-term prednisolone for polymyalgia rheumatica presents with progressive pain in her right hip joint. A diagnosis of avascular necrosis is suspected. Which investigation is most likely to be diagnostic?

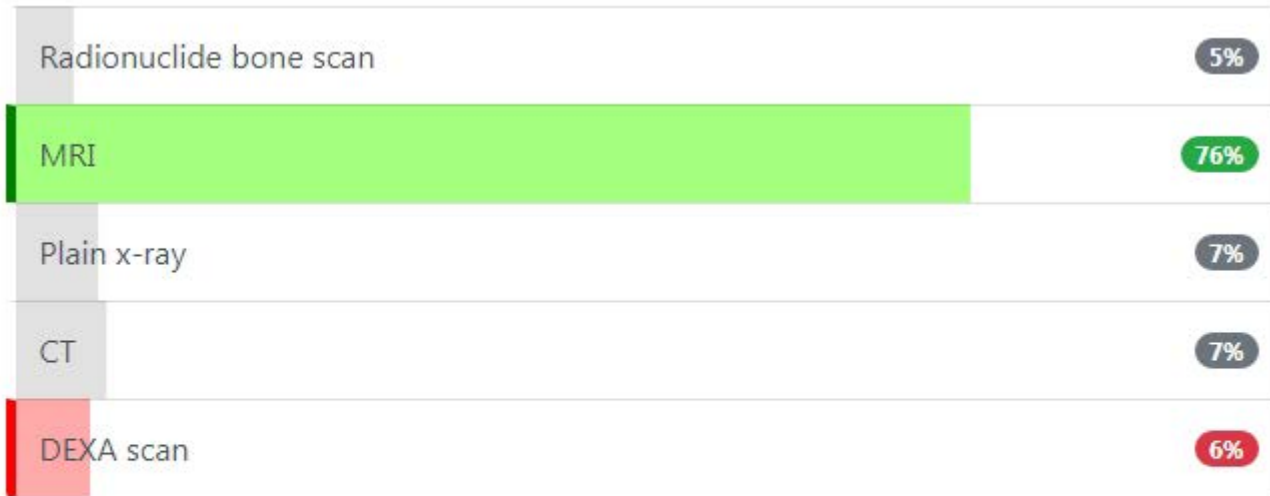
☐ Radionuclide bone scan

☐ MRI

☐ Plain x-ray

☐ CT

☐ DEXA scan



In early avascular necrosis a radionuclide bone scan is less sensitive than MRI and the findings may be nonspecific. MRI is therefore the investigation of choice.

An 28-year-old man is investigated for recurrent lower back pain. A diagnosis of ankylosing spondylitis is suspected. Which one of the following investigations is most useful?

- ☐ ESR
- ☐ X-ray of the sacro-iliac joints
- ☐ HLA-B27 testing
- ☐ X-ray of the thoracic spine
- ☐ CT of the lumbar spine

ESR

4%

X-ray of the sacro-iliac joints

64%

HLA-B27 testing

19%

X-ray of the thoracic spine

6%

CT of the lumbar spine

7%

X-ray of the sacro-iliac joints is the most useful investigation for diagnosis and monitoring, but changes may not be seen for many years after the onset of symptoms

A 69-year-old man presents with an acute episode of gout on his left first metatarsal-phalangeal joint. What is the most likely underlying mechanism?

- ☐ Sedentary lifestyle
- ☐ Decreased renal excretion of uric acid
- ☐ Increased endogenous production of uric acid
- ☐ Starvation
- ☐ Too much protein in diet

Sedentary lifestyle

6%

Decreased renal excretion of uric acid

56%

Increased endogenous production of uric acid

19%

Starvation

4%

Too much protein in diet

14%

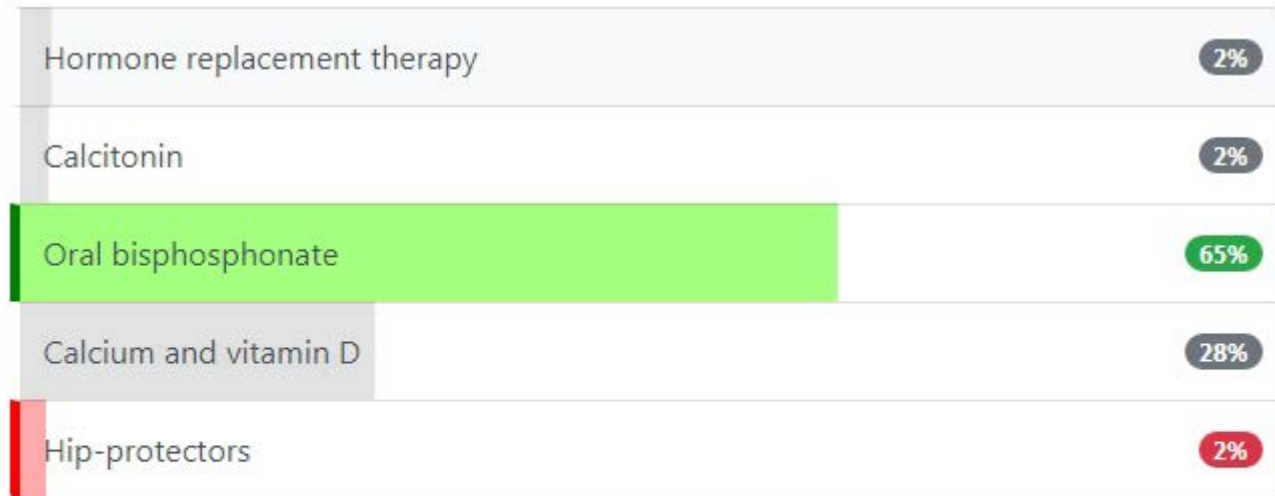
The vast majority of gout is due to decreased renal excretion of uric acid

Important for me Less important

Decreased renal excretion of uric acid is thought to account for 90% of cases of primary gout. Secondary risk factors such as alcohol intake and medications should also be investigated

A 66-year-old female is on long-term prednisolone therapy for polymyalgia rheumatica. What is the most appropriate protection against osteoporosis?

- ☐ Hormone replacement therapy
- ☐ Calcitonin
- ☐ Oral bisphosphonate
- ☐ Calcium and vitamin D
- ☐ Hip-protectors



Oral bisphosphonate therapy is recommended for patients older than 65 years who have taken, or who are likely to remain on oral corticosteroids for more than 3 months

A 76-year-old gentleman is seen in Rheumatology clinic for a painful left first metatarsophalangeal joint. He has a past medical history of chronic kidney disease stage 4, heart failure and poorly controlled type 2 diabetes.

His GP suspects an acute flare-up of gout and would like to commence treatment. What is the most appropriate medication to initiate?

- ☐ Naproxen
- ☐ Prednisolone
- ☐ Colchicine
- ☐ Allopurinol
- ☐ Ibuprofen



The best medication for this patient would be colchicine titrated to his renal function. BNF recommends reducing the dose or increasing the dosage interval if $\text{eGFR } 10\text{--}50\text{ml/minute/1.73m}^2$; avoid if eGFR less than $10\text{mL/minute/1.73m}^2$.

NSAIDs would be contraindicated due to his chronic kidney disease, prednisolone would worsen his already poorly controlled diabetes, and allopurinol would not be indicated for an acute flare.

A 40-year-old woman who is known to have systemic lupus erythematosus is reviewed with an exacerbation of wrist pain. Which one of the following is the most useful marker for monitoring disease activity?

- ☐ C-reactive protein
- ☐ C2 levels
- ☐ Anti-nuclear antibody titres
- ☐ Anti-dsDNA titres
- ☐ Anti-Sm titres

C-reactive protein

19%

C2 levels

9%

Anti-nuclear antibody titres

13%

Anti-dsDNA titres

53%

Anti-Sm titres

5%

A 42-year-old woman complains to her General Practitioner of general fatigue during the last two months. She says the joints in both her hands and wrists are increasingly painful and stiff, especially in the morning and she finds it difficult to write. Her X-ray is diagnostic of rheumatoid arthritis and she is started on methotrexate and sulfasalazine. Which enzyme does methotrexate inhibit?

- ☐ Dihydroorotate dehydrogenase
- ☐ Cyclooxygenase 2
- ☐ Dihydrofolate reductase
- ☐ Matrix metalloproteinase 1
- ☐ Serine hydroxymethyltransferase

Dihydroorotate dehydrogenase

8%

Cyclooxygenase 2

6%

Dihydrofolate reductase

75%

Matrix metalloproteinase 1

5%

Serine hydroxymethyltransferase

6%

Methotrexate works by inhibiting dihydrofolate reductase

Important for me [Less important](#)

The correct answer is 3. Methotrexate is an anti-metabolite that targets the building blocks of DNA, purines, by inhibiting dihydrofolate reductase and therefore preventing the reduction of dihydrofolic acid to tetrahydrofolic acid.

Answer 1 is incorrect. Dihydroorotate dehydrogenase plays an important role in pyrimidine biosynthesis as it is involved in the oxidation of dihydroorotate to orotate. Leflunomide is used in the treatment of Rheumatoid arthritis, as it targets dihydroorotate dehydrogenase.

Answer 2 is incorrect. Cyclooxygenase 2 (COX 2) is necessary for the synthesis of prostanoids (prostaglandins and thromboxanes). COX 2 inhibitors are an example of non-steroidal anti-inflammatory drugs (NSAIDs), helping with inflammation and pain.

Answer 4 is incorrect. Matrix metalloproteinase 1 is an enzyme responsible for the breakdown of interstitial collagens (Type I, II & III), which are part of the extracellular matrix.

Answer 5 is incorrect. Serine hydroxymethyltransferase (SHMT) has an important role in the production of one-carbon units for the cells. SHMT converts tetrahydrofolate to 5,10-methylenetetrahydrofolate and L-serine to glycine.



Discuss

Improve

An 80-year-old woman is started on oral alendronate following a fractured neck of femur. How would you explain how to take the tablet?

- Take it on a full stomach to minimise gastric irritation and avoid lying down for 30 minutes afterwards
- Dissolve tablet in water and take just before breakfast + sit-upright for 30 minutes following
- Take during main evening meal + sit-upright for 2 hours following
- Take at least 30 minutes before breakfast with plenty of water + sit-upright for 30 minutes following
- Take at least 30 minutes after a main meal + sit-upright for 30 minutes following

Take it on a full stomach to minimise gastric irritation and avoid lying down for 30 minutes afterwards

8%

Dissolve tablet in water and take just before breakfast + sit-upright for 30 minutes following

4%

Take during main evening meal + sit-upright for 2 hours following

3%

Take at least 30 minutes before breakfast with plenty of water + sit-upright for 30 minutes following

75%

Take at least 30 minutes after a main meal + sit-upright for 30 minutes following

10%

Bisphosphonates can cause a variety of oesophageal problems

Important for me

Less important

Which one of the following cytokines is the most important in the pathophysiology of rheumatoid arthritis?

- ☐ IFN-beta
- ☐ IFN-alpha
- ☐ IL-4
- ☐ Tumour necrosis factor
- ☐ IL-2

IFN-beta

4%

IFN-alpha

12%

IL-4

13%

Tumour necrosis factor

60%

IL-2

11%

Rheumatoid arthritis - TNF is key in pathophysiology

Important for me Less important

A 26-year-old man presents to his GP complaining of recurrent cramping at the very start of his weekly five-a-side football game. He is usually able to continue playing and the cramps always resolve after the first 10 minutes of play. After these games, his urine can sometimes have the appearance of 'coca-cola'.

What is the most likely underlying diagnosis?

- ☐ March haematuria
- ☐ McArdle's syndrome
- ☐ Sickle cell trait
- ☐ G6PD deficiency
- ☐ Hereditary spherocytosis

March haematuria

18%

McArdle's syndrome

61%

Sickle cell trait

6%

G6PD deficiency

8%

Hereditary spherocytosis

6%

Repeated cramping and myoglobinuria after short bouts of exercise can point towards McArdle's disease

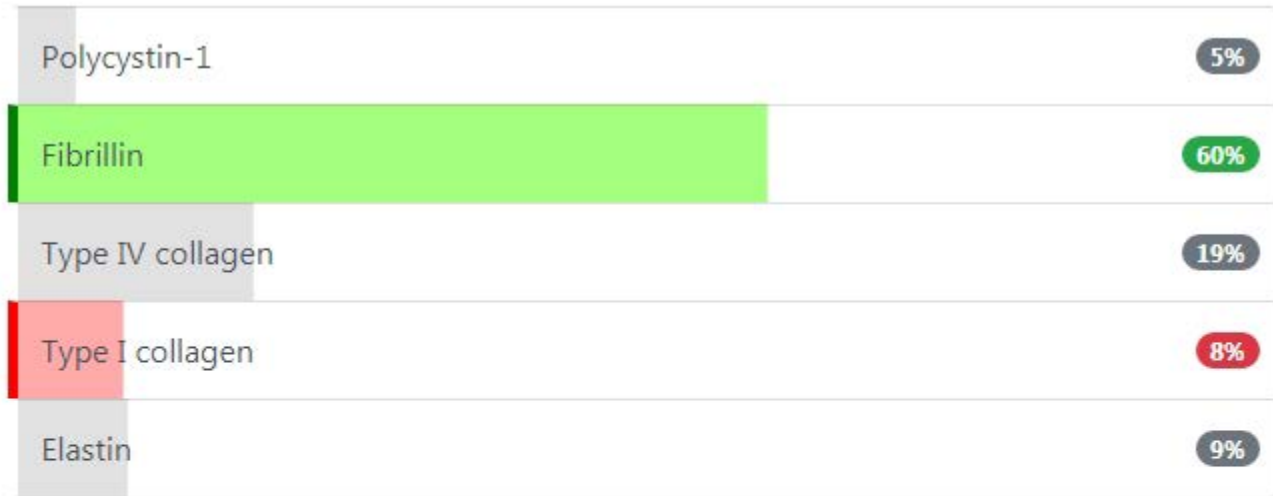
Important for me Less important

The time of onset, the 'second wind' phenomenon, and recurrent symptoms are suggestive of McArdle's syndrome.

Dr Assem

A 34-year-old man is reviewed in clinic. He has recently had his annual echocardiogram showing no change in the dilation of his aortic sinuses or mitral valve prolapse. You note he is tall with pectus excavatum and arachnodactyly. His condition is primarily due to a defect in which one of the following proteins?

- ☐ Polycystin-1
- ☐ Fibrillin
- ☐ Type IV collagen
- ☐ Type I collagen
- ☐ Elastin



Marfan's syndrome is caused by a mutation in a protein called fibrillin-1

Important for me

Less important

Although fibrillin is the primary protein affected (due to a defect in the fibrillin-1 gene) it should be noted that fibrillin is used as a substrate of elastin

A 22-year-old gymnast reports pain in the lateral forearm that is worse on straightening the wrist or fingers. She also sometimes feels an unusual sensation in her hand a bit like pins and needles. On examination, she is tender distal to the common extensor origin with no pain overlying the lateral epicondyle itself.

What is the most likely cause of her forearm pain?

- ☐ Lateral epicondylitis
- ☐ Radial tunnel syndrome
- ☐ Cubital tunnel syndrome
- ☐ Olecranon bursitis
- ☐ Cervical radiculopathy

Lateral epicondylitis

17%

Radial tunnel syndrome

51%

Cubital tunnel syndrome

20%

Olecranon bursitis

7%

Cervical radiculopathy

5%

Radial tunnel syndrome presents similarly to lateral epicondylitis however pain is typically distal to the epicondyle and worse on elbow extension/forearm pronation

Important for me Less important

Radial tunnel syndrome can be difficult to distinguish from lateral epicondylitis as both conditions present with lateral elbow pain. Radial tunnel syndrome however typically presents with tenderness distal to the common extensor origin in comparison to lateral epicondylitis where there is pain over the common extensor origin. It is most common in gymnasts, racquet players and golfers who frequently hyperextend at the wrist or carry out frequent supination/pronation. Patients can also complain of hand paraesthesia or aching at the wrist.

Cubital tunnel syndrome patients experience tingling and numbness in the 4th and 5th finger.

In olecranon bursitis, there would be presence of swelling over the posterior elbow.

Cervical radiculopathy would cause a burning pain radiating from shoulder to fingers. There may be reduced cervical range of motion or pain as clues in the history.

Dr Assem

Which one of the following statements is true regarding cytoplasmic anti-neutrophil cytoplasmic antibodies (cANCA)?

- ☐ Targeted against myeloperoxidase
- ☐ Associated with granulomatosis with polyangiitis
- ☐ Can be used to monitor activity in autoimmune haemolytic anaemia
- ☐ Is more commonly seen in ulcerative colitis than perinuclear ANCA
- ☐ Positive in > 90% of hepatitis C associated vasculitis

Targeted against myeloperoxidase

9%

Associated with granulomatosis with polyangiitis

71%

Can be used to monitor activity in autoimmune haemolytic anaemia

4%

Is more commonly seen in ulcerative colitis than perinuclear ANCA

9%

Positive in > 90% of hepatitis C associated vasculitis

6%

cANCA = granulomatosis with polyangiitis; pANCA = Churg-Strauss + others

Important for me Less important

Which of the following is true regarding rheumatoid factor?

- ☐ It is usually an IgM molecule reacting against patient's own IgG
- ☐ High titres are not associated with severe disease
- ☐ Rose-Waaler test involves agglutination of IgG coated latex particles
- ☐ 80% of SLE patients are RF positive
- ☐ 50% of patients with Sjogren's syndrome are RF positive

It is usually an IgM molecule reacting against patient's own IgG

72%

High titres are not associated with severe disease

7%

Rose-Waaler test involves agglutination of IgG coated latex particles

6%

80% of SLE patients are RF positive

6%

50% of patients with Sjogren's syndrome are RF positive

9%

Rheumatoid factor is an IgM antibody against IgG

Important for me

Less important

A 25-year-old man presents with a painful, swollen left knee. He returned 4 weeks ago from a holiday in Spain. There is no history of trauma and he has had no knee problems previously. On examination he has a swollen, warm left knee with a full range of movement. His ankle joints are also painful to move but there is no swelling. On the soles of both feet you notice a waxy yellow rash. What is the most likely diagnosis?

- ☐ Rheumatoid arthritis
- ☐ Psoriatic arthritis
- ☐ Gout
- ☐ Reactive arthritis
- ☐ Gonococcal arthritis

Rheumatoid arthritis

2%

Psoriatic arthritis

11%

Gout

3%

Reactive arthritis

54%

Gonococcal arthritis

29%

The rash on the soles is keratoderma blenorrhagica. His reactive arthritis may be secondary to either gastrointestinal infection or *Chlamydia*.

A 48-year-old patient presented to her family physician complaining of pain all over her body for the past 4 months. She initially thought it was because she started taking aerobic exercise classes 6 months ago. However, the pain has been persistently bothering her and taking over-the-counter pain relievers did not help. The pain is more pronounced around her shoulders and lower back. She also complains feeling tired and not being able to sleep because of the pain. She has a body mass index of 28 kg per m² and has never smoked in her life. She denies any weight loss or episodes of fever. She currently lives alone and is usually able to do her household chores. Her mother who passed away last year suffered from rheumatoid arthritis. On examination, the doctor finds that the patient has tender areas on her neck, elbow regions, and knees. Which is the most likely diagnosis in this patient?

- ☐ Polymyalgia rheumatica
- ☐ Fibromyalgia
- ☐ Polymyositis
- ☐ Ankylosing spondylitis
- ☐ Rheumatoid arthritis

Polymyalgia rheumatica	25%
Fibromyalgia	61%
Polymyositis	6%
Ankylosing spondylitis	4%
Rheumatoid arthritis	5%

This patient presented with a chronic pain described as all over her body for the past 6 months. The pain did not appear to be originating from the joints and therefore this makes a diagnosis of rheumatoid arthritis unlikely. The two most likely diagnoses are fibromyalgia and polymyalgia rheumatica. However, polymyalgia rheumatica would have also presented with weight loss and fever. This patient most likely has fibromyalgia. She also feels tired and suffers from sleep disturbances, which are both common complaints in patients suffering from fibromyalgia.

- 1: This is a musculoskeletal condition most common in patients above 50 years of age. It is associated with elevated levels of inflammatory markers such as ESR and CRP and is associated with giant cells arteritis. However, serum CK and muscle biopsy are normal.
- 2: Fibromyalgia is characterized by a widespread musculoskeletal pain and tender at several points in the body.
- 3: There is no history of muscle weakness in this patient. Muscle weakness in the shoulder region would have made a diagnosis of polymyositis likely.
- 4: This is an inflammatory musculoskeletal condition which most affects the axial skeleton. It is strongly associated with HLA-B27 histocompatibility complex. The first presentation is usually a pain in the lower back region due to sacroiliitis.
- 5: Rheumatoid arthritis is a common painful inflammatory musculoskeletal condition affecting the joints. It is an autoimmune condition which usually affects the small joints of the hands and feet in a symmetric distribution. Patients often develop deformities such as ulnar deviation as the disease progresses and articular structures are destroyed.

Which one of the following antibodies is most specific for systemic lupus erythematosus?

- ☐ Anti-neutrophil cytoplasmic antibodies
- ☐ Anti-nuclear antibodies
- ☐ Anti-Sm antibodies
- ☐ Anti-RNP antibodies
- ☐ Anti-cardiolipin antibodies

Anti-neutrophil cytoplasmic antibodies

5%

Anti-nuclear antibodies

23%

Anti-Sm antibodies

61%

Anti-RNP antibodies

4%

Anti-cardiolipin antibodies

7%

SLE: ANA is 99% sensitive - anti-Sm & anti-dsDNA are 99% specific

Important for me Less important

What is the most common cardiac defect seen in Marfan's syndrome

- ☐ Mitral valve prolapse
- ☐ Coarctation of the aorta
- ☐ Bicuspid aortic valve
- ☐ Dilation of the aortic sinuses
- ☐ Ventricular septal defect

Mitral valve prolapse

28%

Coarctation of the aorta

8%

Bicuspid aortic valve

12%

Dilation of the aortic sinuses

50%

Ventricular septal defect

2%

Marfan's syndrome is associated with dilation of the aortic sinuses which may predispose to aortic dissection

Important for me Less important

Whilst mitral valve prolapse is seen in Marfan's syndrome, dilation of the aortic sinuses is more common

A 43-year-old who is noted to have a high-arched palate, arachnodactyly and a late-systolic murmur presents with visual problems. Which one of the following eye disorders is most associated with his underlying condition?

- ☐ Superotemporal ectopia lentis
- ☐ Inferonasal ectopia lentis
- ☐ Retinitis pigmentosa
- ☐ Acute glaucoma
- ☐ Retinal detachment

Superotemporal ectopia lentis

56%

Inferonasal ectopia lentis

14%

Retinitis pigmentosa

14%

Acute glaucoma

3%

Retinal detachment

13%

Marfan's syndrome - upwards lens dislocation

Important for me Less important

This patient has features consistent with Marfan's syndrome. Whilst glaucoma and retinal detachment are seen they are not as common as superotemporal ectopia lentis (upwards lens dislocation), which is seen in around 50% of patients. Inferonasal ectopia lentis is characteristic of homocystinuria

Mitral valve prolapse may cause a late-systolic murmur. This feature helps distinguish the above description from that of a patient with homocystinuria

An 86-year-old woman presented to the emergency department complaining of a 2-day history of difficulty weight bearing and pain in the right knee. She is known to have atrial fibrillation, for which she is currently anticoagulated with warfarin. Her INR 2 weeks ago was seen to be 4.4, and she subsequently had her warfarin dose adjusted. On examination, you note that her right knee is red, hot and tender with a fluctuant effusion. What is the next most appropriate step?

- ☐ Intravenous flucloxacillin
- ☐ 5mg oral vitamin K
- ☐ Commence colchicine
- ☐ Aspirate the joint
- ☐ Discharge the patient with advice to rest, ice, compress and elevate the leg.

Intravenous flucloxacillin	9%
5mg oral vitamin K	12%
Commence colchicine	3%
Aspirate the joint	73%
Discharge the patient with advice to rest, ice, compress and elevate the leg.	3%

The red, hot, tender joint is an important presentation in acute rheumatology. The three classic differentials for this presentation are septic arthritis, gout and pseudogout. In this lady, in view of the previously high INR, joint haematoma is also an important consideration. It is not possible to differentiate these conditions clinically, so joint aspiration is the most important next step. Culture will enable a positive diagnosis of septic arthritis, whilst microscopy and gross appearance the diagnosis of crystal arthropathy.

If there is a high clinical index of suspicion of septic arthritis, the patient should be commenced on IV antibiotics. However, this should be done after joint aspiration so that more targeted therapy can be performed subsequently.

Warfarin reversal is not necessary in this case due to the low-risk nature of joint aspiration and the fact that her previous INR was only 4.4 with a subsequent reduction in dose. Colchicine is a useful medication in the acute management of gout, but the diagnosis is yet to be established. Discharging the patient at this point is premature.

Patients with Sjogren's syndrome are at an increased risk of which one of the following malignancies?

- ☐ Myeloma
- ☐ Oesophageal cancer
- ☐ Intraocular melanoma
- ☐ Squamous cell skin cancer
- ☐ Non-Hodgkin's lymphoma

Myeloma

6%

Oesophageal cancer

15%

Intraocular melanoma

4%

Squamous cell skin cancer

16%

Non-Hodgkin's lymphoma

58%

Patients with Sjogren's syndrome have an increased risk of lymphoid malignancies

Important for me Less important

Which one of the following statements regarding systemic lupus erythematosus is true?

- ☐ It is linked with HLA A5
- ☐ Onset is typically between 20-40 years old
- ☐ It is more common in Caucasians
- ☐ The female:male ratio is 3:1
- ☐ The incidence has decreased in the past 30 years

It is linked with HLA A5

4%

Onset is typically between 20-40 years old

55%

It is more common in Caucasians

9%

The female:male ratio is 3:1

28%

The incidence has decreased in the past 30 years

4%

A 45-year-old woman is referred to rheumatology outpatients with a 4 month history of joint pains, myalgia and generalised lethargy. An autoantibody screen reveals she is ANA positive and anti-ribonucleoprotein positive. The creatine kinase is elevated at 525. What is the most likely diagnosis?

- ☐ Systemic lupus erythematosus
- ☐ Mixed connective tissue disease
- ☐ Polymyositis
- ☐ Dermatomyositis
- ☐ CREST syndrome

Systemic lupus erythematosus

8%

Mixed connective tissue disease

58%

Polymyositis

22%

Dermatomyositis

8%

CREST syndrome

4%

Anti-ribonuclear protein (anti-RNP) = mixed connective tissue disease

Important for me Less important

You see a 28-year-old man with severe back pain. He has had lumbar back pain for 2 years on and off but today the pain became much worse when he bent over to pick up a sock yesterday. He complains of pain down the posterolateral side of his right leg. He also says when he touches this area it feels numb. He says that his right leg feels weak.

On examination, he has sensory loss of the posterolateral aspect of his right leg and lateral aspect of his foot. He has weakness in plantar flexion of his right foot, a reduced ankle reflex on the right, and a positive sciatic nerve stretch test.

You believe he has slipped a disc. Where is the site of the compression?

☐ L2

☐ L3

☐ L4

☐ L5

☐ S1



S1 lesion features = Sensory loss of posterolateral aspect of leg and lateral aspect of foot, weakness in plantar flexion of foot, reduced ankle reflex, positive sciatic nerve stretch test

Important for me Less important

The correct answer here is an S1 lesion. An S1 lesion causes sensory loss of the posterolateral aspect of the leg and lateral aspect of the foot, weakness in plantar flexion of the foot, reduced ankle reflexes, and a positive sciatic nerve stretch test.

An L2 lesion would cause pain that radiates to the anterior thigh but also would involve the posterior pelvis and possibly the buttocks. Weakness would involve the Iliopsoas muscle, so a patient might complain of weak hip flexion (eg when climbing the stairs). This muscle also pulls the leg forward when walking so weakness will reduce the length of the stride and cause a limp. Therefore, option 1 is wrong.

A 31-year-old female with a history of SLE gives birth following a 39 week pregnancy. The newborn is noted to be bradycardic. Which one of the following autoantibodies are associated with congenital heart block?

- ☐ Anti-Ro
- ☐ Anti-Sm
- ☐ Anti-RNP
- ☐ Anti-dsDNA
- ☐ Anti-Jo 1

Anti-Ro

54%

Anti-Sm

14%

Anti-RNP

9%

Anti-dsDNA

11%

Anti-Jo 1

12%

SLE - antibodies associated with congenital heart block = anti-Ro

Important for me

Less important

Perinuclear antineutrophil cytoplasmic antibodies (pANCA) are most strongly associated with which condition?

- ☐ Goodpasture's syndrome
- ☐ Churg-Strauss syndrome
- ☐ Polyarteritis nodosa
- ☐ Granulomatosis with polyangiitis
- ☐ Autoimmune hepatitis

Goodpasture's syndrome

8%

Churg-Strauss syndrome

64%

Polyarteritis nodosa

8%

Granulomatosis with polyangiitis

16%

Autoimmune hepatitis

4%

cANCA = granulomatosis with polyangiitis; pANCA = Churg-Strauss + others

Important for me Less important

What is the most common target of pANCA?

- ☒ Plasminogen activator inhibitor-1
- ☐ Elastase
- ☐ Myeloperoxidase
- ☐ Serine proteinase 3
- ☐ Cathepsin G



Myeloperoxidase is a neutrophil protein whose primary role is the generation of oxygen free radicals.

A 72-year-old woman presents with a severe right-sided headache and some blurring of vision that comes and goes. She has no significant past medical history. On examination, there is tenderness on palpation of her right temporal region. Visual acuity is 6/36 in her right eye and 6/9 in her left.

Investigations:

Erythrocyte sedimentation rate	154mm/hr (1-36)
C-reactive protein	116mg/L (<10)

What drug should be given initially?

- ☐ Cyclosporine (intravenous)
- ☐ Leflunomide (oral)
- ☐ Methotrexate (oral)
- ☐ Prednisolone (oral)
- ☐ Methylprednisolone (intravenous)

Cyclosporine (intravenous)	2%
Leflunomide (oral)	2%
Methotrexate (oral)	3%
Prednisolone (oral)	42%
Methylprednisolone (intravenous)	51%

This patient has temporal arteritis, also known as giant cell arteritis (GCA).

The American College of Rheumatology 1990 criteria requires 3 of the following for GCA diagnosis:

- 1. Age >50 y/o
- 2. New onset localised headache
- 3. Temporal artery tenderness or decreased pulsation
- 4. ESR >50mm/hr
- 5. Temporal artery biopsy positive

Uncomplicated GCA (no visual involvement and/or jaw/tongue claudication) should be treated with oral prednisolone 40-60mg daily until symptoms and investigations normalise.

Complicated GCA (with visual involvement and/or jaw/tongue claudication), as in this scenario, should be given IV methylprednisolone 500-1000mg for 3 days before starting oral prednisolone.

As GCA requires long-term steroid therapy bone sparing agents (a bisphosphonate and vitamin D) and a gastroprotective drug (e.g omeprazole) should be prescribed. Also, low dose aspirin should be considered as it has been shown to reduce the rate of visual loss and cerebrovascular accidents in GCA.

(Source: Royal College of Physicians guidelines)

Link: <http://www.rcplondon.ac.uk/sites/default/files/giant-cell-arteritis-concise-guideline.pdf>

A 38-year-old woman is reviewed. She has a diagnosis of rheumatoid arthritis. She has recently been switched from methotrexate to leflunomide. Monitoring of the full blood count and liver function tests has been arranged. What else should be monitored during treatment?

- ☐ Peak expiratory flow rate
- ☐ Blood pressure
- ☐ QT interval on ECG
- ☐ Blood glucose
- ☐ Urine for microscopic haematuria

Peak expiratory flow rate

29%

Blood pressure

30%

QT interval on ECG

20%

Blood glucose

9%

Urine for microscopic haematuria

12%

Leflunomide may cause hypertension

Important for me

Less important

A 54-year-old man is recovering following his first episode of gout. He still has some residual pain in the big toe. He has no risk factors for the development of gout and there is no evidence of gouty tophi on examination.

What is the most suitable point to start uric acid-lowering therapy?

- ☐ Immediately
- ☐ Once his symptoms of gout have fully settled
- ☐ 4 weeks after his symptoms of gout have fully settled
- ☐ If one further attack of gout in the next 12 months
- ☐ If more than 4 episodes of gout in a 1 year period

Immediately

13%

Once his symptoms of gout have fully settled

31%

4 weeks after his symptoms of gout have fully settled

19%

If one further attack of gout in the next 12 months

32%

If more than 4 episodes of gout in a 1 year period

5%

Gout: offer allopurinol after first attack of gout has settled

Important for me Less important

The 2017 British Society for Rheumatology guidelines no longer advocate a delay before starting urate-lowering therapy (ULT) but do give the following advice:

Commencement of ULT is best delayed until inflammation has settled as ULT is better discussed when the patient is not in pain

Dr Assem

You review a 48-year-old woman who is taking methotrexate for rheumatoid arthritis. Concurrent prescription of which other medication should be avoided?

- ☐ Erythromycin
- ☐ Trimethoprim
- ☐ Sumatriptan
- ☐ Lansoprazole
- ☐ Sodium valproate

Erythromycin

13%

Trimethoprim

60%

Sumatriptan

6%

Lansoprazole

5%

Sodium valproate

16%

The concurrent use of methotrexate and trimethoprim containing antibiotics may cause bone marrow suppression and severe or fatal pancytopenia

Important for me Less important

There is an increased risk of haematological toxicity when trimethoprim is prescribed alongside methotrexate.

Dr Assem

You are doing the annual review of a 50-year-old woman who has rheumatoid arthritis. Which one of the following complications is most likely to occur as a result of her disease?

- ☐ Chronic lymphocytic leukaemia
- ☐ Hypertension
- ☐ Colorectal cancer
- ☐ Type 2 diabetes mellitus
- ☐ Ischaemic heart disease

Chronic lymphocytic leukaemia

9%

Hypertension

12%

Colorectal cancer

8%

Type 2 diabetes mellitus

12%

Ischaemic heart disease

59%

Rheumatoid arthritis: patients have an increased risk of IHD

Important for me Less important

A 58-year-old woman with a history of left hip osteoarthritis presents for review. She is currently taking co-codamol 30/500 for pain on a regular basis but this is unfortunately not controlling her symptoms. There is no past medical history of note, in particular no asthma or gastrointestinal problems. What is the most suitable next step in management?

- ☐ Switch to regular oral tramadol
- ☐ Add topical ibuprofen
- ☐ Add oral ibuprofen + proton pump inhibitor
- ☐ Add oral etoricoxib
- ☐ Add oral diclofenac

Switch to regular oral tramadol

7%

Add topical ibuprofen

20%

Add oral ibuprofen + proton pump inhibitor

57%

Add oral etoricoxib

8%

Add oral diclofenac

8%

NICE recommend co-prescribing a PPI with NSAIDs in all patients with osteoarthritis

Important for me Less important

Topical NSAIDs are only indicated for osteoarthritis of the knee or hand.

Dr Assem

A 44-year-old woman is seen in the rheumatology clinic. She has been referred with Raynaud's phenomenon. During the review of systems she mentions that her GP is organising an endoscopy to investigate dyspepsia. On examination she is noted to have tight, shiny skin over her fingers. Which one of the following complications is she most likely to develop?

- ☐ Bronchiectasis
- ☐ Angiodysplasia
- ☐ Arterial hypertension
- ☐ Chronic kidney disease
- ☐ Pulmonary hypertension



This patient is likely to have CREST syndrome. Unfortunately pulmonary hypertension is one of the more common late complications seen in such patients.

A 32-year-old woman presents with a facial rash that appears to be worse in summer. She has also noticed intermittent swelling of the small joints of her hands and describes suffering from Raynaud's syndrome for 5 years.

Given the likely diagnosis which of these auto-antibodies is most likely to be positive?

- ☐ Anti-dsDNA
- ☐ Anti-nuclear cytoplasmic antibody
- ☐ Anti-nuclear antibody
- ☐ Anti-Sm
- ☐ Anti-Ro

Anti-dsDNA	29%
Anti-nuclear cytoplasmic antibody	7%
Anti-nuclear antibody	52%
Anti-Sm	7%
Anti-Ro	5%

This lady presents with a photosensitive rash, Raynaud's syndrome and small joint arthritis - giving a likely diagnosis of systemic lupus erythematosus (SLE).

Anti-nuclear (ANA) antibody is the most likely antibody to be present. Approximately 95% of people with SLE have a positive ANA, however it is not very specific.

Anti-Sm are the most specific antibodies for SLE, but only around 35% of patients with SLE will be positive. Anti-dsDNA antibodies are positive in around 70% of SLE cases.

Anti-Ro antibodies are present in 15% of patients with SLE, but are more frequently associated with Sjögren's syndrome.

Anti-nuclear cytoplasmic antibodies are not associated with SLE. They are associated with inflammatory bowel disease and vasculitis such as Wegener's granulomatosis.

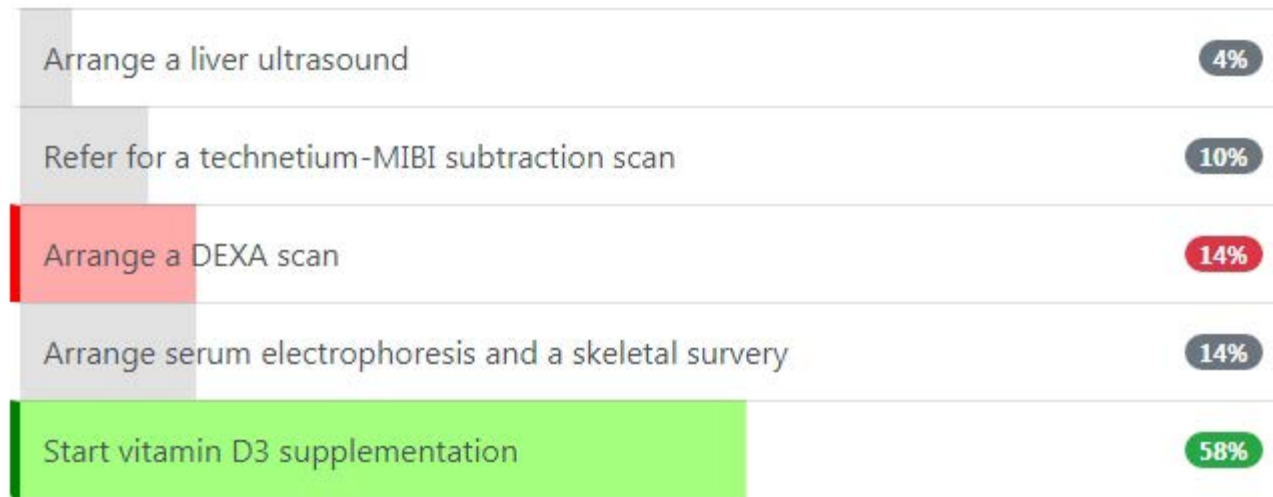
Dr Assem

A 58-year-old woman complains of aches and pains in her bones. Her family have noticed she is generally weak and lethargic. A series of blood tests are requested:

Calcium	2.04 mmol/l
Albumin	39 g/l
Phosphate	0.63 mmol/l
Alkaline phosphatase	271 U/l
Vitamin D3	15 nmol/l (75-200 nmol/l)
Parathyroid hormone	10.8 pmol/l (0.8 - 8.5 pmol/l)

What is the most appropriate management?

- ☐ Arrange a liver ultrasound
- ☐ Refer for a technetium-MIBI subtraction scan
- ☐ Arrange a DEXA scan
- ☐ Arrange serum electrophoresis and a skeletal survey
- ☐ Start vitamin D3 supplementation



The low calcium, phosphate and vitamin D levels combined with a raised alkaline phosphatase and parathyroid hormone level is entirely consistent with osteomalacia, or vitamin D deficiency. The treatment of choice is therefore vitamin D3 supplementation.

Remember blood values are normal in osteoporosis. Myeloma ('Arrange serum electrophoresis and a skeletal survey') and primary hyperparathyroidism ('Refer for a technetium-MIBI subtraction scan') are associated with hyper- rather than hypocalcaemia.

A 51-year-old male presents with an acute onset of swelling and pain in his right knee. Aspiration shows negatively birefringent crystals with no organisms seen. His pain fails to settle with NSAIDs. What is the most appropriate next step in his management?

- ☐ Repeat joint aspiration and intra-articular corticosteroid
- ☐ Allopurinol
- ☐ IV flucloxacillin
- ☐ Diuretics
- ☐ Low dose methotrexate

Repeat joint aspiration and intra-articular corticosteroid

61%

Allopurinol

24%

IV flucloxacillin

6%

Diuretics

3%

Low dose methotrexate

7%

A 79-year-old man presents with a history of lower back pain and right hip pain. Blood tests reveal the following:

Calcium	2.20 mmol/l
Phosphate	0.8 mmol/l
ALP	890 u/L

What is the most likely diagnosis?

- ☐ Primary hyperparathyroidism
- ☐ Chronic kidney disease
- ☐ Osteomalacia
- ☐ Osteoporosis
- ☐ Paget's disease

Primary hyperparathyroidism

4%

Chronic kidney disease

3%

Osteomalacia

17%

Osteoporosis

5%

Paget's disease

71%

Paget's disease - old man, bone pain, raised ALP

Important for me Less important

The normal calcium and phosphate combined with a raised alkaline phosphate points to a diagnosis of Paget's

A 2-year-old girl is brought to her pediatrician. The mother complains that she noticed her daughter has been having repeated ear infections despite repetitive oral antibiotic treatment courses. The mother is very concerned and also thinks that her daughter has not been putting much weight recently. The mother is also worried that the condition might affect her child's hearing and subsequent development. Upon examination, the pediatrician finds a scaly and erythematous rash on the girl's scalp.

The pediatrician decides to get an X-ray of the skull which shows lytic bone lesions. The girl was born via spontaneous vaginal delivery and has been well previously. The physician later explains to an assisting intern that electron microscopy of the skin lesions in this condition typically shows tennis racket-shaped granules.

What is the most likely diagnosis?

- ☐ Recurrent otitis media
- ☐ Osteopetrosis
- ☐ Paget disease of the bone
- ☐ Langerhans cell histiocytosis
- ☐ Sarcoidosis

Recurrent otitis media	4%
Osteopetrosis	17%
Paget disease of the bone	21%
Langerhans cell histiocytosis	55%
Sarcoidosis	3%

Langerhans cell histiocytosis is characterized by Birbeck granules on electron microscopy

Important for me Less important

This patient presented with the signs and symptoms of Langerhans cell histiocytosis. This is supported by the clinical manifestation of recurrent otitis media, skin rash and the lytic bone lesions. Langerhans cell histiocytosis is a multi-system disease and it is a proliferative condition of the dendritic cells in the skin. The disease involves the formation of multiple granulomas throughout the body. It commonly presents in childhood but can also be found in adults. A classic electron microscopic finding of a biopsy which helps identify the condition is the presence of Birbeck granules which are tennis-racket shaped. (First Aid 2017, p412).

1: Recurrent otitis media is a condition commonly characterized by a loss of hearing and ear pain. It commonly presents in young children due to a shorted and not yet fully developed Eustachian tube. Otitis media by itself is often a benign condition and patients may be prescribed a short of oral antibiotics and analgesia. If it is chronic and involves an effusion, a grommet may be inserted. However, if the condition persists and is accompanied by other symptoms, further assessments and investigations are warranted to rule out other causes.

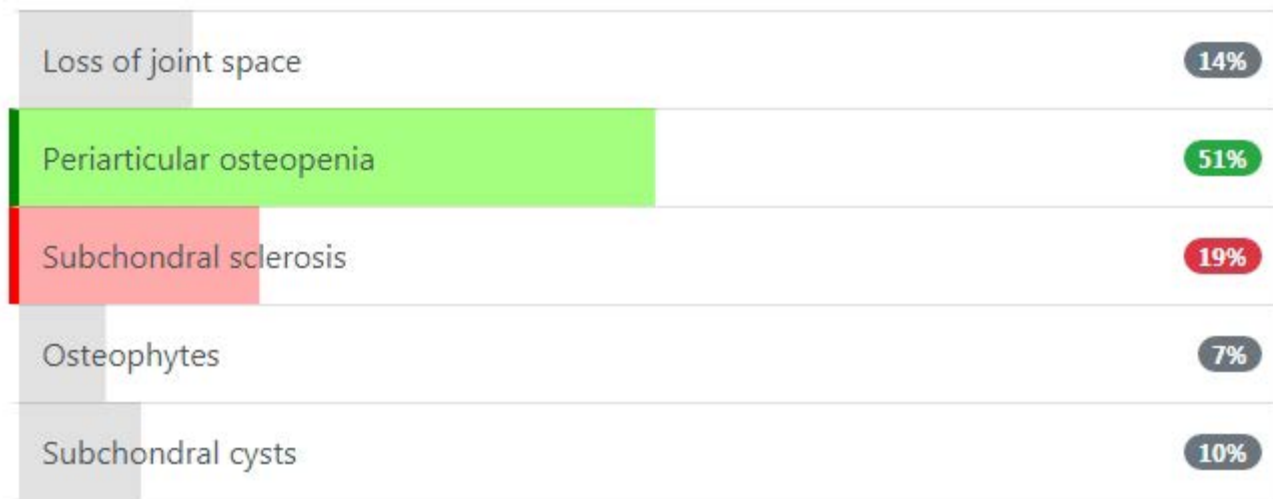
2: Osteopetrosis is a disease of the bone characterized by the presence of bones which are thick and brittle. The pathological process of the diseases involves the failure of osteoclastic bone resorption. As the osteoclasts fail to resorb bone tissue, cortical thickening and sclerosis follow. The resulting affected bone thickens but very easily fractured. When the disease occurs in the skull, nerves passing via the narrow foramina become impinged and can, therefore, result in the onset of neurological symptoms depending on which nerve is affected. X-ray finding includes symmetrical and diffuse skeletal sclerosis, also termed as "stone bone". Therapy potentially includes a bone marrow transplant.

3: Paget disease of the bone, also known as osteitis deformans, is a bone disease which is driven by both an increase in the action of osteoclasts and osteoblasts. A typical clinical sign associated with the disease is an increase in hat size caused by a thickening of the skull bone. Laboratory findings reveal normal serum calcium, phosphate, and parathyroid hormone level. Treatment involves the use of bisphosphonates.

5: Sarcoidosis is a multi-system disease with an immunological origin. A typical histopathological finding of sarcoidosis is the occurrence of non-caseating granulomas. A high level of serum angiotensin-converting enzyme is classical. The diseases can affect the kidneys, the lungs, the skin, and many other systems. From an epidemiological perspective, sarcoidosis has been found to be more common in African-American females. Treatment involves the use of steroids and managing other co-morbidities which may develop with the long-term use of steroids.

A 64-year-old female is referred to rheumatology out-patients by her GP with a history of arthritis in both hands. Which one of the following x-ray findings would most favour a diagnosis of rheumatoid arthritis over other possible causes?

- ☐ Loss of joint space
- ☐ Periarticular osteopenia
- ☐ Subchondral sclerosis
- ☐ Osteophytes
- ☐ Subchondral cysts



Periarticular osteopenia and osteoporosis would point towards a diagnosis of rheumatoid arthritis (RA). Loss of joint space is common in both RA and osteoarthritis

You review a 40-year-old mechanic who presents with joint pains. For the past two months he has noticed intermittent pain, stiffness and swelling of the joints in his hands and feet. The stiffness tends to improve during the day but the pain tends to get worse. He has also noticed stiffness in his back but cannot remember any aggravating injury. You order some blood tests (taken during an acute attack) which are reported as follows:

Rheumatoid factor	Negative
Anti-cyclic citrullinated peptide antibody	Positive
Uric acid	0.3 mmol/l (0.18 - 0.48)
ESR	41 mm/hr

What is the most likely diagnosis?

- ☐ Reactive arthritis
- ☐ Ankylosing spondylitis
- ☐ Gout
- ☐ Osteoarthritis
- ☐ Rheumatoid arthritis

Reactive arthritis

6%

Ankylosing spondylitis

11%

Gout

2%

Osteoarthritis

3%

Rheumatoid arthritis

78%

Anti-cyclic citrullinated peptide antibodies are associated with rheumatoid arthritis

Important for me Less important

Anti-cyclic citrullinated peptide antibody is highly specific for rheumatoid arthritis.

A 25-year-old woman presents for review. She has a history of depression and is currently prescribed citalopram. Despite returning from a recent holiday in Spain she complains of feeling tired all the time. On examination you notice a slightly raised red rash on the bridge of her nose and cheeks. Although she complains of having 'stiff joints' you can find no evidence of arthritis. You order some basic blood tests:

Hb	12.7 g/dl
Platelets	$130 \times 10^9/l$
WBC	$3.3 \times 10^9/l$

Na ⁺	138 mmol/l
K ⁺	4.0 mmol/l
Urea	3.4 mmol/l
Creatinine	77 μ mol/l

Free T4	12.2 pmol/l
TSH	1.25 mu/l
CRP	9 mg/l

What is the most likely diagnosis?

- ☐ Systemic lupus erythematosus
- ☐ Acne rosacea
- ☐ Fibromyalgia
- ☐ Lyme Disease
- ☐ HIV seroconversion illness

Systemic lupus erythematosus	66%
Acne rosacea	10%
Fibromyalgia	10%
Lyme Disease	8%
HIV seroconversion illness	6%

The malar rash, arthralgia, lethargy and history of mental health points towards a diagnosis of SLE. Remember that the CRP (in contrast to the ESR) is typically normal in SLE.

A 30-year-old woman is diagnosed with systemic lupus erythematosus after presenting with lethargy, arthralgia and a facial rash. Her rheumatologists starts her on hydroxychloroquine. Which one of the following is it most important to monitor?

- ☐ Blood pressure
- ☐ Blood sugar
- ☐ QT interval on ECG
- ☐ Visual acuity
- ☐ Peak expiratory flow rate

Blood pressure

9%

Blood sugar

5%

QT interval on ECG

21%

Visual acuity

60%

Peak expiratory flow rate

5%

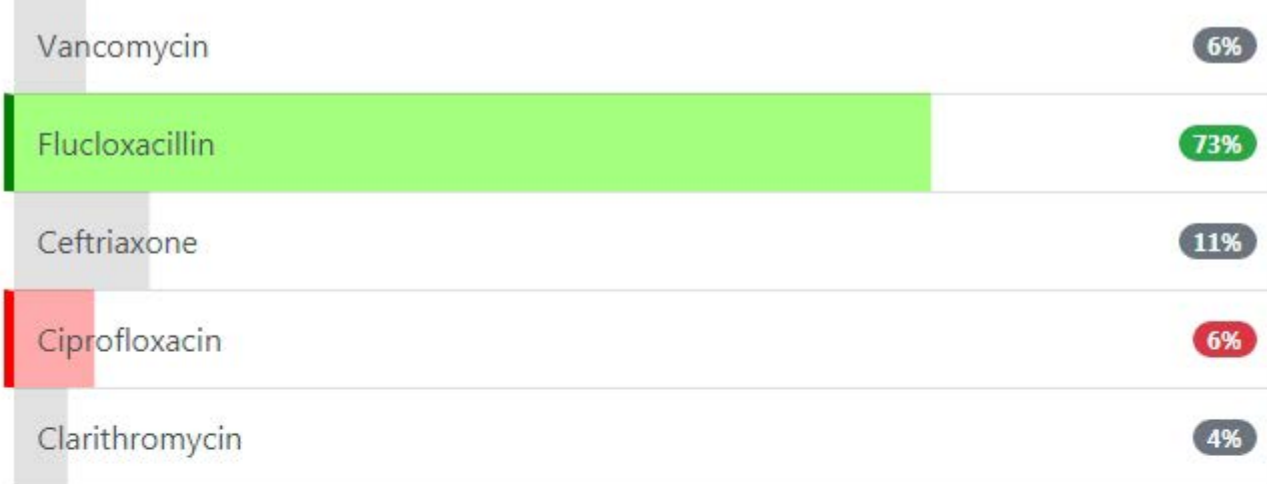
Hydroxychloroquine - may result in a severe and permanent retinopathy

Important for me

Less important

You are working in the emergency department. A 30-year-old lady with rheumatoid arthritis has been referred by her GP with a two day history of worsening pain and swelling in the left wrist. It has now become so bad in the last few hours that she can barely move it. She returned from Thailand two weeks ago where she was travelling with some friends. She had no problems with her wrist when travelling, but does remember getting a rash on her chest and arms one day when it was particularly hot. This only lasted a day. Her rheumatoid arthritis is usually well controlled on methotrexate. She has no drug allergies. You aspirate the wrist which returns a turbid fluid and send it for gram stain. Given the likely diagnosis which intravenous antibiotic do you start her on?

- ☐ Vancomycin
- ☐ Flucloxacillin
- ☐ Ceftriaxone
- ☐ Ciprofloxacin
- ☐ Clarithromycin



The diagnosis is septic arthritis. The most common bacteria being *Staph.aureus*. Patients with rheumatoid arthritis are particularly prone to septic arthritis. The rash was a heat rash and a red-herring. Flucloxacillin is the first line treatment for non-penicillin allergic septic arthritis.

Vancomycin is reserved for MRSA positive septic arthritis.

Ceftriaxone is used in gonococcal arthritis.

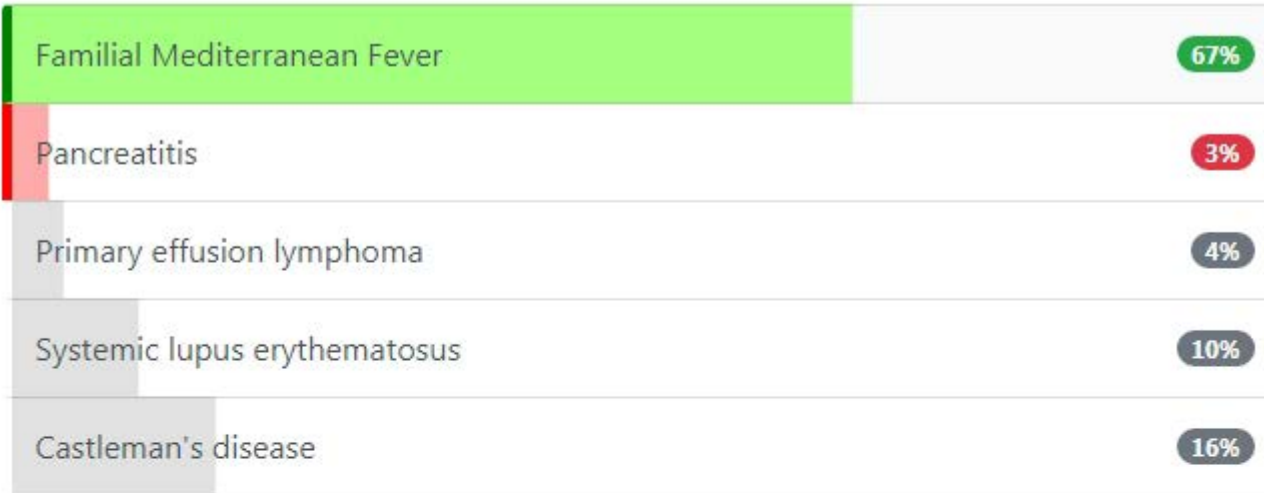
Ciprofloxacin and clarithromycin are not used in septic arthritis (unless microbiology specifically dictates based on sensitivities).

An 18-year-old Armenian gentleman is admitted with abdominal pains, fever and hip arthralgia. He has had recurrent abdominal pains in the past but without a confirmed diagnosis. A prior single port laparoscopy revealed no apparent deficit.

On examination, you note the left lung base is stony dull to percussion with a pericardial rub on auscultation of the heart.

What is the likely underlying diagnosis?

- ☐ Familial Mediterranean Fever
- ☐ Pancreatitis
- ☐ Primary effusion lymphoma
- ☐ Systemic lupus erythematosus
- ☐ Castleman's disease



The answer is Familial Mediterranean Fever which typically presents in a Turkish, Armenian, and Arabic demographic, as stated in the question, with a polyserositis.

Pancreatitis, primary effusion lymphoma, systemic lupus erythematosus, Castleman's disease are all associated with polyserositis. The lack of findings on laparoscopy and other surgical findings weakens the diagnosis of pancreatitis. The absence of lymphadenopathy makes primary effusion lymphoma and Castleman's disease less likely. The stem makes no mention of a rash, photosensitivity, renal involvement, autoantibodies or pancytopenia which makes lupus much less likely, also.

A 67-year-old reports tingling and numbness in the little and ring finger of his left hand. He reports the pain initially came and went but has now become constant. The pain is worse if he leans on his elbow and he recalls a previous elbow fracture as a child.

Given the clinical history what is the most likely cause of his symptoms?

- ☐ Cubital tunnel syndrome
- ☐ Medial epicondylitis
- ☐ Radial tunnel syndrome
- ☐ Carpal tunnel syndrome
- ☐ De Quervains tenosynovitis

Cubital tunnel syndrome

48%

Medial epicondylitis

24%

Radial tunnel syndrome

11%

Carpal tunnel syndrome

8%

De Quervain's tenosynovitis

9%

Cubital tunnel syndrome is caused by compression of the ulnar nerve and can present with tingling/numbness of the 4th and 5th finger

Important for me Less important

The answer here is cubital tunnel syndrome which occurs due to compression of the ulnar nerve as it passes through the cubital tunnel. Initial symptoms include tingling and numbness of the 4th and 5th finger. Often pain is worse on leaning on the affected elbow and there is a history of osteoarthritis or prior trauma to the area.

Medial epicondylitis would not cause distal symptoms in the hand but pain of the medial elbow.

Radial tunnel syndrome causes aching and paraesthesia of the hand with forearm pain distal to the lateral epicondyle

Carpal tunnel syndrome is caused by compression of the median nerve and presents with pain and tingling of the thumb, index, middle and medial half of the ring finger

De Quervain's tenosynovitis typically causes symptoms affecting the base of the thumb.

A 75-year-old female presents to her general practitioner with muscle weakness that has become progressively worse over the last year. She can no longer walk or stand for a long period of time. She also has a purple rash on her eyelids, red lumps on her knees and elbows and cracked painful skin on her fingers. What autoantibody is most likely to be causing these symptoms?

- ☐ Anti-cyclic citrullinated peptide (anti-CCP)
- ☐ Anti-double-stranded DNA (anti-dsDNA)
- ☐ Antinuclear (ANA)
- ☐ Anti-topoisomerase (anti-Scl-70)
- ☐ Anti-mitochondrial (AMA)

Anti-cyclic citrullinated peptide (anti-CCP)	7%
Anti-double-stranded DNA (anti-dsDNA)	7%
Antinuclear (ANA)	48%
Anti-topoisomerase (anti-Scl-70)	25%
Anti-mitochondrial (AMA)	13%

This patient has the inflammatory condition, dermatomyositis. Dermatomyositis is associated with ANA. It presents with symptoms/signs such as proximal muscle weakness, a macular rash over back/shoulders, a violet periorbital rash and red papules over extensor surfaces of the fingers.

Anti-CCP antibodies are associated with rheumatoid arthritis. Rheumatoid arthritis typically presents with joint pain.

Anti-dsDNA antibodies are associated with systemic lupus erythematosus (SLE). SLE generally presents with non-specific symptoms such as, fatigue, fever, oral ulcers, joint pain and a rash.

Anti-Scl-70 antibodies are associated with diffuse systemic sclerosis. This would present with proximal limb or trunk scleroderma.

AMA is associated with primary biliary cirrhosis (PBC). PBC is often asymptomatic in the early stages but may present as fatigue, pruritus and jaundice.

A 34-year-old female with a history of discoid lupus erythematosus is reviewed in clinic. The erythematous, scaly rash on her face has not responded to topical steroid creams. What is the most appropriate next step in management?

- ☐ UV light therapy
- ☐ Oral hydroxychloroquine
- ☐ Topical dapsone
- ☐ Oral prednisolone
- ☐ Topical hydroxychloroquine

UV light therapy

11%

Oral hydroxychloroquine

46%

Topical dapsone

10%

Oral prednisolone

17%

Topical hydroxychloroquine

15%

Discoid lupus erythematosus - topical steroids → oral hydroxychloroquine

Important for me Less important

Which one of the following is most consistently associated with a poor prognosis in rheumatoid arthritis?

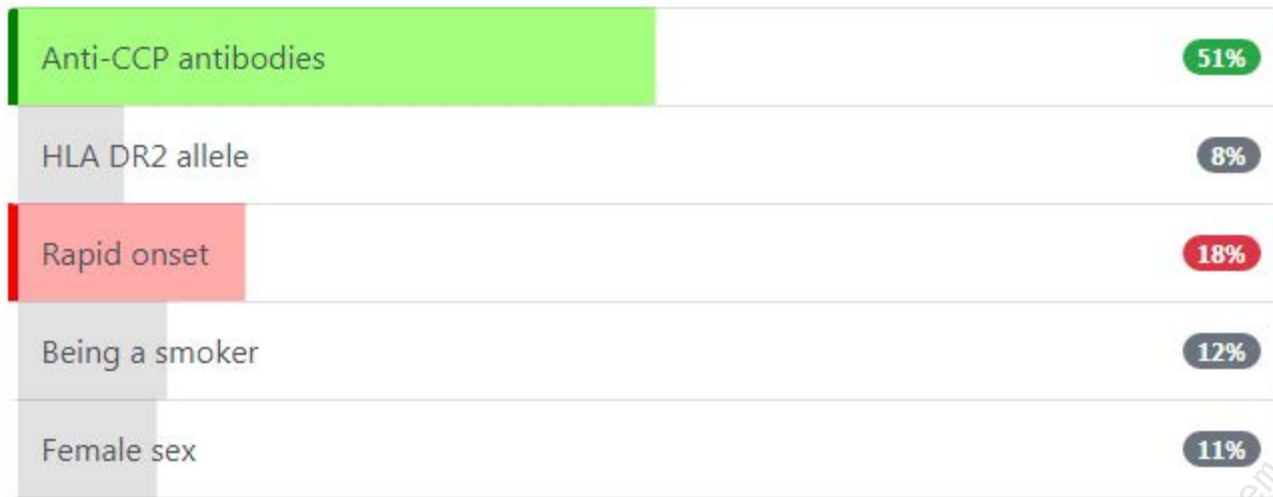
☐ Anti-CCP antibodies

☐ HLA DR2 allele

☐ Rapid onset

☐ Being a smoker

☐ Female sex



See below for further information on the effect of gender on prognosis.